[ORAL ARGUMENT NOT SCHEDULED]

Nos. 22-1080, 22-1144, 22-1145

IN THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

NATURAL RESOURCES DEFENSE COUNCIL, et al.,

Petitioners,

v.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION, et al.,

Respondents.

On Petition for Review of a Final Rule
Issued by the Department of Transportation,
National Highway Traffic Safety Administration

FINAL BRIEF FOR RESPONDENTS

Of Counsel:

JOHN E. PUTNAM
General Counsel

PAUL M. GEIER
Assistant General Counsel

JOHN DONALDSON
Acting Chief Counsel

HUNTER OLIVER
Attorney, National Highway Traffic Safety Administration

Department of Transportation

BRIAN M. BOYNTON
Principal Deputy Assistant Attorney General

MARK B. STERN
JOSHUA M. KOPPEL
KEVIN J. KENNEDY
Attorneys, Appellate Staff
Civil Division, Room 7212
U.S. Department of Justice
950 Pennsylvania Avenue NW
Washington, DC 20530
(202) 514-4820

CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

Pursuant to D.C. Circuit Rule 28(a)(1), the undersigned counsel certifies as follows:

A. Parties and Amici

Petitioners in these consolidated cases are Natural Resources Defense Council (No. 22-1080); Texas, Arkansas, Indiana, Kentucky, Louisiana, Mississippi, Montana, Nebraska, Ohio, South Carolina, and Utah (No. 22-1144); and American Fuel & Petrochemical Manufacturers (No. 22-1145).

Respondents are National Highway Traffic Safety Administration (NHTSA); United States Department of Transportation; Ann Carlson, in her official capacity as Acting Administrator of NHTSA; and Pete Buttigieg, in his official capacity as Secretary of Transportation. Steven Cliff was previously a respondent in his official capacity as Administrator of NHTSA.

Intervenors are Clean Fuels Development Coalition; Diamond Alternative Energy, LLC; ICM, Inc.; Illinois Corn Growers Association; Kansas Corn Growers Association; Kentucky Corn Growers Association; Michigan Corn Growers Association; Missouri Corn Growers

Association; Texas Corn Producers Association; Minnesota Soybean Growers Association; Valero Renewable Fuels Company, LLC; Wisconsin Corn Growers Association; City and County of Denver; City of Los Angeles; City of San Francisco; Massachusetts; Pennsylvania; District of Columbia; Environmental Defense Fund; Environmental Law and Policy Center; National Coalition for Advanced Transportation; Natural Resources Defense Council; Public Citizen; Sierra Club; California; Colorado; Connecticut; Delaware; Hawaii; Illinois; Maine; Maryland; Michigan; Minnesota; Nevada; New Jersey; New Mexico; New York; North Carolina; Oregon; Vermont; Washington; Wisconsin; Union of Concerned Scientists; and Zero Emission Transportation Association.

Amici are California Business Roundtable; California Manufacturers & Technology Association; Western States Petroleum Association; National Federation of Independent Business; California Asphalt Pavement Association; American Trucking Associations, Inc.; Energy Marketers of America; Texas Oil & Gas Association; Louisiana Mid-Continent Oil & Gas Association; Petroleum Alliance of Oklahoma; Texas Independent Producers and Royalty Owners Association; Texas

Association of Manufacturers; Texas Royalty Council; American Royalty Council; Alliance for Automotive Innovation; West Virginia; Alabama; Kansas; Missouri; Oklahoma; Tennessee; Virginia; Wyoming; ConservAmerica; Two Hundred for Homeownership; Institute for Policy Integrity at New York University School of Law; Senator Tom Carper; and Representative Frank Pallone, Jr.

B. Rulings Under Review

Petitioners seek review of a final rule issued by NHTSA. Corporate Average Fuel Economy Standards for Model Years 2024-2026 Passenger Cars and Light Trucks, 87 Fed. Reg. 25,710 (May 2, 2022).

C. Related Cases

These cases have not previously been before this Court or any other court. Other than these three consolidated cases, respondents are not aware of any related cases within the meaning of D.C. Circuit Rule 28(a)(1)(C). The Court's September 22, 2022 order in these cases directed that oral argument be held on the same day and before the same panel as *Texas v. EPA*, No. 22-1031, et al. (D.C. Cir.).

/s/ Joshua M. Koppel
Joshua M. Koppel

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GLOSSARY

Fuel Manufacturers	American Fuel & Petrochemical Manufacturers
CAFE Model	Corporate Average Fuel Economy Compliance and Effects Modeling System
EPA	Environmental Protection Agency
EPCA	Energy Policy and Conservation Act of 1975
FRIA	Final Regulatory Impact Analysis
NHTSA	National Highway Traffic Safety Administration
NRDC	Natural Resources Defense Council
TSD	Technical Support Document

INTRODUCTION

Congress enacted the Energy Policy and Conservation Act of 1975 (EPCA) to promote the conservation of energy supplies and to improve the energy efficiency of motor vehicles. The Act requires the Secretary of Transportation to establish mandatory average fuel-economy standards for passenger cars and light trucks for each model year. Those standards are to be set at "the maximum feasible average fuel economy level that the Secretary decides [automobile] manufacturers can achieve in that model year." 49 U.S.C. § 32902(a). The Secretary has delegated authority to set fuel-economy standards to the National Highway Traffic Safety Administration (NHTSA).

Congress has recognized the important and growing role of dedicated alternative-fuel vehicles, such as battery-electric vehicles, in furthering the nation's energy-conservation goals. To that end, EPCA contains various measures to encourage production of those vehicles. Congress did not want the agency to set fuel-economy standards at a level that would require manufacturers to produce new alternative-fuel vehicles, however. Accordingly, in determining what efficiency gains are practicable and feasible during the period covered by new

standards, NHTSA considers only the gains that can be achieved without producing new alternative-fuel vehicles.

That was the case with the fuel-economy standards for model years 2024 through 2026 at issue in this litigation. The agency began with an inventory of every vehicle sold in model year 2020 and then analyzed the means by which automakers could apply additional fuel-saving technology to their existing fleet of vehicles. In doing so, NHTSA accounted for pre-existing federal and state legal requirements that would affect how manufacturers would modify their fleets going forward. But, in accordance with the statute, NHTSA did not consider the possibility that automakers could create new battery-electric vehicles in model years 2024 to 2026 to comply with more stringent standards under EPCA. Using this analysis, the agency set the fuel-economy standards at the maximum level that it determined manufacturers can feasibly achieve without producing new alternative-fuel vehicle models.

1. The American Fuel & Petrochemical Manufacturers (the Fuel Manufacturers) and a group of States have petitioned for review,

arguing that the rule will result in undue fuel-economy gains and that they will thus be injured by reduced revenues from gasoline sales.

EPCA was designed to reduce the nation's dependence on petroleum products, and petitioners are quite wrong to insist that the statute's treatment of alternative-fuel vehicles dictates a contrary result. As noted, in determining the fuel-economy status quo, NHTSA considers the average fuel economy of a manufacturer's pre-existing fleet. Working from that starting point, it then determines the average fuel economy that can be achieved by the end of the regulatory period without applying alternative-fuel technology to additional vehicle models in the regulated years.

Petitioners urge, however, that in determining pre-existing average fleet fuel economy, NHTSA should exclude all alternative-fuel vehicles. Because these vehicles are generally significantly more fuel-efficient, their exclusion would systematically lower the starting point from which to calculate feasible improvements. The gap between petitioners' fictional construct and the actual fleets will only continue to increase as alternative-fuel cars become more prevalent. At some point, the actual fleets will already have achieved any fuel-economy standard

that NHTSA could set on the basis of feasible improvements to the fictional fleet. Petitioners' counterfactual methodology would make it impossible for NHTSA to set standards that would force any efficiency gains in gasoline-powered vehicles, a result precisely opposite to Congress's stated goal.

2. The Natural Resources Defense Council (NRDC) has also petitioned for review, contending NHTSA understated feasible efficiency gains by underestimating the extent to which high compression ratio engines can be used to improve the fleet's fuel economy. NHTSA adequately explained and supported its technical determination that those engines cannot feasibly be implemented in certain vehicles such as pickup trucks, and petitioner has provided no grounds for setting aside that expert judgment.

Because the factual and legal issues raised by the NRDC petition are distinct from those raised by the Fuel Manufacturers and States, we address the NRDC petition separately after our discussion of the Fuel Manufacturers' and States' petitions.

STATEMENT OF JURISDICTION

NHTSA issued the final rule under review on May 2, 2022. 87 Fed. Reg. 25,710 (JA873). The petitions for review were filed on May 11, 2022 (No. 22-1080) and June 30, 2022 (Nos. 22-1144 and 22-1145). This Court has jurisdiction pursuant to 49 U.S.C. § 32909(a).

STATEMENT OF THE ISSUES

In revising the fuel-economy standards for model years 2024 to 2026, NHTSA determined "the maximum feasible average fuel economy level" that automobile manufacturers can achieve in those years. 49 U.S.C. § 32902(a). As required by statute, NHTSA excluded the possibility that manufacturers would comply with revised standards by producing new dedicated alternative-fuel vehicles, such as battery-electric vehicles, or using compliance credits. The issues presented are:

1. Whether NHTSA acted lawfully in establishing fuel-economy standards when it accounted for the dedicated alternative-fuel vehicles already being produced and sold in model year 2020.

2. Whether NHTSA acted lawfully when it accounted for the battery-electric vehicles manufacturers are expected to produce in compliance with pre-existing legal requirements imposed by States.

3. Whether NHTSA acted lawfully in considering the dedicated alternative-fuel vehicles that automakers are expected to produce and compliance credits they are expected to use in model years outside of 2024 to 2026.

4. Whether NHTSA's conceded error in considering the combined electric and gasoline fuel economy of plug-in hybrid electric vehicles was harmless.

5. Whether NHTSA acted arbitrarily or capriciously in determining that high compression ratio engine technology cannot feasibly be applied in certain vehicles.

PERTINENT STATUTES

Pertinent statutes are reproduced in the addendum to this brief.

STATEMENT OF THE CASE

A. Statutory Background

In the aftermath of the 1973 oil crisis, Congress enacted the Energy Policy and Conservation Act, Pub. L. No. 94-163, 89 Stat. 871 (1975). *See* H.R. Rep. No. 94-430, at 1-3 (1975), *reprinted in* 1975 U.S.C.C.A.N. 1762, 1763-1765. Congress observed that "[t]he fundamental reality is that this nation has entered a new era in which energy resources previously abundant, will remain in short supply,

retarding our economic growth and necessitating an alteration in our life's habits and expectations." *Id.* at 1. The goals of EPCA are therefore to "decrease dependence upon foreign imports, enhance national security, achieve the efficient utilization of scare resources, and guarantee the availability of domestic energy supplies at prices consumers can afford." S. Rep. No. 94-516, at 117 (1975) (Conf. Rep.), *reprinted in* 1975 U.S.C.C.A.N. 1956, 1957; *see also* 89 Stat. at 874.

In furtherance of the goal of conserving energy, Title III of EPCA established average fuel-economy standards for automobiles. 89 Stat. at 901. These standards "set a minimum performance requirement in terms of an average number of miles a vehicle travels per gallon of gasoline or diesel fuel." *Center for Auto Safety v. NHTSA*, 793 F.2d 1322, 1324 (D.C. Cir. 1986). "Individual vehicles and models are not required to meet the mileage standard; rather, each manufacturer must achieve *an average* level of fuel economy for all specified vehicles manufactured in a given model year." *Id.*; *see also* 49 U.S.C. §§ 32901(a)(6), 32904.

In its current form, the statute directs the Secretary of Transportation to prescribe, by regulation, separate average fuel-

economy standards for passenger automobiles, light trucks ("non-passenger automobiles," in the parlance of the statute), and medium- and heavy-duty trucks. 49 U.S.C. § 32902(b)(1). The Secretary of Transportation has delegated authority to establish average fuel-economy standards to the National Highway Traffic Safety Administrator. 49 C.F.R. § 1.95(a).

The Secretary must establish fuel-economy standards for passenger cars and light trucks "[a]t least 18 months before the beginning of each model year." 49 U.S.C. § 32902(a). The Secretary may also amend a fuel-economy standard previously established, but any amendment increasing a standard's stringency must be prescribed at least 18 months before the beginning of the model year to which the amendment applies. *Id.* § 32902(g).

The statute requires that each fuel-economy standard prescribed by the Secretary "shall be the maximum feasible average fuel economy level that the Secretary decides the manufacturers can achieve in that model year." 49 U.S.C. § 32902(a); *see also id.* § 32902(b)(2)(B). Congress identified four factors to guide the Secretary's decision-making: (1) "technological feasibility," (2) "economic practicability,"

(3) "the effect of other motor vehicle standards of the Government on fuel economy," and (4) "the need of the United States to conserve energy." *Id.* § 32902(f).

Congress also placed three constraints on the Secretary's determination of the maximum feasible average fuel-economy level. The first two constraints concern automobiles that operate wholly or partially on an "alternative fuel" such as electricity. *See* 49 U.S.C. § 32901(a)(1). First, the Secretary "may not consider the fuel economy of dedicated automobiles." *Id.* § 32902(h)(1). A dedicated automobile is a vehicle (such as a battery-electric vehicle) that operates only on an alternative fuel. *Id.* § 32901(a)(8). Second, the Secretary "shall consider dual fueled automobiles"—that is, automobiles capable of operating on alternative fuel *and* on gasoline or diesel (such as plug-in hybrid vehicles)—"to be operated only on gasoline or diesel fuel." *Id.* § 32902(h)(2); *see also id.* § 32901(a)(9).

The third constraint provides that the Secretary "may not consider[] … the trading, transferring, or availability of [compliance] credits." 49 U.S.C. § 32902(h)(3). Manufacturers earn such credits when the average fuel economy of their fleet exceeds the applicable fuel-

economy standard. Those compliance credits can then be applied to achieve compliance with the fuel-economy standards in any of the three prior model years or five subsequent model years. *Id.* § 32903. Manufacturers can sell credits they do not need. *Id.* § 32903(f).

The Environmental Protection Agency (EPA) is charged with calculating the fuel economy of each model of vehicle and the average fuel economy of all vehicles sold by a manufacturer in a given model year. 49 U.S.C. § 32904(a), (c). A vehicle's fuel economy is generally the number of miles traveled by the automobile for each gallon of gasoline (or equivalent amount of other fuel) consumed. *Id.* § 32901(a)(11). Although NHTSA may not consider dedicated automobiles in determining the maximum feasible fuel-economy level that manufacturers can achieve, those vehicles are accounted for in determining automakers' compliance with the standards. The EPA determines the compliance fuel economy of battery-electric vehicles—which use no gasoline—using a petroleum-equivalency factor determined by the Secretary of Energy. *Id.* § 32904(a)(2). EPA calculates the fuel economy of electric dual-fueled automobiles (*i.e.*, plug-in hybrid electric vehicles) based on a formula that accounts for

how much of the time the vehicle is expected to use each source of fuel. *Id.* § 32905(e). As a general matter, battery-electric vehicles and plug-in hybrids obtain substantially higher compliance fuel economy than internal combustion engine vehicles.[1]

B. Regulatory Background

1. The 2021 proposed rule

In 2020, NHTSA issued a final rule that established fuel-economy standards for model years 2021 to 2026. 85 Fed. Reg. 24,174 (Apr. 30, 2020). Under that rule, fuel-economy standards would increase in stringency 1.5% per year, from an estimated 38.5 miles per gallon in 2023 to 40.4 miles per gallon in 2026. *Id.* at 24,175, 24,199.[2] The

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[1] *Compare, e.g.*, NHTSA, *Market Data File*, vehicles tab, rows 1114-1116, col. M (battery-electric models of the Hyundai Kona have a fuel-economy compliance value of approximately 175.5 miles per gallon), *with id.* at vehicles tab, rows 1102-1113, col. J (gasoline models of the Hyundai Kona have a fuel-economy compliance value of approximately 36.5 to 40.5 miles per gallon). The Market Data File is located at Central_Analysis/input/market_data_ref.xlsx within the Central_Analysis.zip file located at https://www.nhtsa.gov/file-downloads?p=nhtsa/downloads/CAFE/2022-FR-LD-2024-2026/Central%20Analysis/ (last updated Jan. 19, 2023).

[2] The actual fuel-economy standards are calculated based on the footprint of the vehicles a manufacturer sells in a given year. *See* 85 Fed. Reg. at 24,175. Accordingly, the fuel-economy requirements for a given manufacturer depend on the size of the vehicles that manufacturer ultimately sells, and thus the fuel-economy requirements

Continued on next page.

standards were substantially less stringent than those that NHTSA had projected for those model years in 2012, when it anticipated that a subsequent rule would establish fleet-wide average fuel-economy standards of 48.7 to 49.7 miles per gallon by 2025. *See id.* at 24,186.

On January 20, 2021, President Biden issued an executive order instructing the Secretary of Transportation to review the 2020 final rule for consistency with, *inter alia*, the nation's commitment "to listen to the science" and "to improve public health and protect our environment." Exec. Order No. 13,990, 86 Fed. Reg. 7037, 7037 (Jan. 25, 2021). After conducting that review, NHTSA issued a notice of proposed rulemaking to amend the fuel-economy standards for model years 2024 to 2026. 86 Fed. Reg. 49,602, 49,603 (Sept. 3, 2021). The agency proposed to increase the standards at a rate of eight percent year-over-year during that period (in contrast with the 1.5% annual increases under the 2020 rule). *Id.*[3]

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described here are necessarily estimates based on manufacturers' projected sales. *See id.* at 24,182 n.28.

[3] EPA separately proposed to revise the greenhouse gas emission standards for model years 2023 and later. *See* 86 Fed. Reg. 43,726 (Aug. 10, 2021). That rulemaking was completed in December 2021. *See* 86 Fed. Reg. 74,434 (Dec. 30, 2021). Although EPA and NHTSA

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2. The 2022 final rule

In May 2022, NHTSA issued a final rule amending the fuel-economy standards for both passenger cars and light trucks. 87 Fed. Reg. at 25,710 (JA873). Under the rule, the fuel-economy standards will increase by eight percent per year in model years 2024 and 2025 and an additional ten percent in model year 2026, at which point the standards will require an estimated average fuel-economy level of 49.1 miles per gallon. *Id.*

NHTSA determined that the more stringent fuel-economy standards would result in "large consumer fuel savings" and "estimated increases in employment," with "manageable average per-vehicle cost increases" and only "minimal effects on sales." 87 Fed. Reg. at 25,721 (JA884). NHTSA also noted that "nearly all auto manufacturers have announced forthcoming advanced technology[] [and] high-fuel-economy vehicle models[] and made strong public commitments" to improve fuel

had previously issued joint rulemakings establishing fuel-economy and greenhouse gas emissions standards, respectively, they proceeded by separate rulemakings in this instance. *See* 87 Fed. Reg. at 25,722 (JA885). The agencies "coordinated," however, "to avoid inconsistencies and produce requirements that are consistent with the agencies' respective statutory authorities." *Id.*

economy. *Id.* at 26,002 (JA1165). These public announcements, combined with NHTSA's own updated analysis of technological feasibility and cost, "indicate[d] that significant improvements in fuel economy relative to the existing standards are feasible and economically practicable." *Id.* NHTSA further found that more stringent average fuel-economy standards will "protect consumers from oil market volatility from global events outside the borders of the U.S." *Id.* at 25,721 (JA884).

a. *The CAFE Model*

As NHTSA has done since 2001, the agency used the Corporate Average Fuel Economy Compliance and Effects Modeling System (CAFE Model) to assess the effects of different possible fuel-economy standards. 87 Fed. Reg. at 25,745 (JA908). The CAFE Model is a comprehensive computational model that helps "estimate[] how vehicle manufacturers might respond to a given regulatory scenario," considering available technologies and vehicle-redesign constraints, as well as "what impact that response will have on fuel consumption, emissions, and economic externalities." *Id.*; *see also id.* at 25,755 (JA918).

The CAFE Model begins with four spreadsheet files that contain data compiled by engineers, economists, and safety and environmental program analysts at NHTSA and the Department of Transportation. 87 Fed. Reg. at 25,755 (JA918); NHTSA, Tech. Supp. Doc. 35 (Mar. 2022) (TSD) (JA497). The first of these—the market data file—describes the existing fleet for each manufacturer. It identifies all the vehicles the manufacturers produced in the most recent year for which data is available—in this case 2020—along with their production volumes, technologies, and existing fuel-economy levels. 87 Fed. Reg. at 25,756 (JA919); TSD 90-91, 103-104 (JA552-553, 565-566). The market data file also identifies the extent to which each model vehicle could be upgraded with various technologies to improve the vehicle's fuel economy. TSD 91 (JA553).

The second file—the technologies file—identifies over 70 technologies available to improve fuel economy and data on the technologies' costs. TSD 91-92 (JA553-554).[4]

[4] One of the numerous potential technology choices that the CAFE Model simulated was high compression ratio engines. There is further background on that technology, which is relevant to NRDC's petition for review, *infra* pp. 84-94.

The third file—the parameters file—contains economic data relevant to determining the impact of agency standards, such as the price of fuel and the social cost of carbon, as well as data about the impact of various technologies on safety. TSD 92-95 (JA554-557).

The fourth file—the scenarios file—describes the regulatory alternatives that NHTSA is considering and for which the CAFE Model will simulate the effects. TSD 95 (JA557). For the 2022 rulemaking, NHTSA considered four alternative amendments to the fuel-economy standards as well as a "no-action" alternative in which NHTSA would have retained the standards established in 2020. *See* 87 Fed. Reg. at 25,896 (JA1059).

Using these input files, the CAFE Model simulated how each manufacturer could adjust its fleet going forward in response to each of the regulatory alternatives. *See* 87 Fed. Reg. at 25,754, 25,756 n.92 (JA917, 919 n.92). It did so by simulating the application of "various technologies to different vehicle models in each manufacturer's product line." *Id.* at 25,754 (JA917); *see also* TSD 60, 89 (JA522, 551). Subject to a variety of constraints recognizing, for example, that certain technologies cannot feasibly be applied to certain types of vehicles, *see*

87 Fed. Reg. at 25,789 (JA952), the model "applies technologies based on their relative cost-effectiveness" until the manufacturer achieves compliance with a given regulatory scenario. *Id.* at 25,754-25,755 (JA917-918). The CAFE Model then projected the energy-savings, economic, public-health, and environmental consequences of each of the regulatory scenarios. *See* TSD 35 (JA497).

In addition to the fuel-economy standards that NHTSA promulgates pursuant to EPCA, the CAFE Model's simulations and projections also accounted for four other factors that may motivate manufacturers to make technological upgrades. First, even in the absence of regulation, manufacturers may implement fuel-saving technology where doing so is cost effective for consumers, because consumers will demand those upgrades. *See* TSD 67, 70 (JA529, 532). Second, NHTSA anticipated that manufacturers will comply with the greenhouse gas emissions standards established by EPA in 2020. TSD 61 (JA523). Third, NHTSA recognized that five major manufacturers (BMW, Ford, Honda, Volkswagen, and Volvo) had voluntarily committed themselves to more stringent greenhouse gas emission standards through contractual arrangements with California, and the

CAFE Model treated those commitments as binding on those manufacturers. *See* 87 Fed. Reg. at 25,721, 25,722, 25,897 (JA884, 885, 1060); TSD 71 (JA533). Fourth, NHTSA anticipated that manufacturers would comply with the zero-emission vehicle program adopted by California and 11 other States, which requires manufacturers that sell cars within those States to meet zero-emission vehicle credit standards, primarily through the production of battery-electric and plug-in hybrid vehicles. 87 Fed. Reg. at 25,762-25,763, 25,762 n.102 (JA925-926, 925 n.102).

The CAFE Model thus accounted for multiple legal requirements, both federal and state, that will affect how manufacturers modify their fleets going forward. And this was true both in simulating the regulatory baseline (*i.e.*, the no-action alternative in which NHTSA left the fuel-economy standards at the level established in the 2020 rulemaking) and in simulating compliance with the various regulatory alternatives.

As required by the constraints in 49 U.S.C. § 32902(h), NHTSA's model excluded any consideration of the possibility that manufacturers would comply with EPCA fuel-economy standards by using compliance

credits or by applying battery-electric vehicle (or other dedicated alternative-fuel vehicle) technology to any new vehicle models during the timeframe for which NHTSA was establishing standards (model years 2024 to 2026). *See* 87 Fed. Reg. at 25,748 (JA911); NHTSA, CAFE Model Documentation 33 (Apr. 2022) (CAFE Model Documentation) (JA838) ("Technologies that convert a vehicle to a battery-electric or a fuel-cell vehicle … will be further restricted from application during these 'standard setting' years."); CAFE Model Documentation 104 (JA869) ("[C]redit transfers and credit carry forward are not considered by the modeling system during the years that are identified as 'standard setting.'"). NHTSA did assume, however, that manufacturers would continue to produce the battery-electric vehicle models already in production in the starting fleet (model year 2020). For model years other than those that were the subject of NHTSA's regulation, NHTSA also considered whether manufacturers were expected to introduce new battery-electric vehicles for any of the reasons described above. *See* 87 Fed. Reg. at 25,995-25,996 (JA1158-1159). And, in all model years, NHTSA assumed that manufacturers will comply with state zero-emission vehicle programs by adding

battery-electric vehicles. *See id.* at 25,983 (JA1146). Again, these constraints were applied in the same manner in the CAFE Model's simulation of each regulatory alternative, including the no-action alternative.

b. ***NHTSA's determination that the final standards are the maximum feasible fuel-economy standards that manufacturers can achieve in model years 2024 to 2026***

Informed by the projections generated by the CAFE Model, NHTSA considered each of the four factors set out at 49 U.S.C. § 32902(f). NHTSA determined that the final rule is technologically feasible because sufficient proven technology already "exists to meet the standards." 87 Fed. Reg. at 25,967 (JA1130). The final standards will require some manufacturers to introduce more technology into their vehicles than they otherwise would, but the standards will "not compel the introduction of yet-unproven technologies," nor will manufacturers need to further electrify their fleet to comply with the standards (though that remains a compliance option under the statute). *Id.* at 25,968 (JA1131).

With respect to economic practicability, NHTSA concluded that the standards would have "relatively small estimated sales effects and actually positive estimated effects on employment." 87 Fed. Reg. at 26,003, 26,023 (JA1166, 1186). The agency also conducted a cost-benefit analysis considering, *inter alia*, reduced fuel costs, reduced climate damages, improved public health, technology costs to increase fuel economy, and loss in fuel revenue, and concluded that the final rule will result in net benefits of $16.3 billion. *Id.* at 26,022 (JA1185).

With respect to energy conservation, NHTSA determined that the final rule would, over the lives of vehicles produced prior to model year 2030, save about 60 billion gallons of gasoline. 87 Fed. Reg. at 25,736 (JA899). The standards are also expected to reduce greenhouse gas emissions by approximately 607 million metric tons of carbon dioxide, 733,000 metric tons of methane, and 17,000 tons of nitrous oxide. *Id.* at 25,738 (JA901).

Finally, NHTSA determined that the amended standards are "complementary to other motor vehicle standards of the Government and feasible to achieve in the context of those other standards." 87 Fed. Reg. at 26,024 (JA1187).

C. Procedural Background

Three sets of petitioners sought review of NHTSA's rule. The Natural Resources Defense Council alleges that the fuel-economy standards are too lenient, and that its members have been injured by "increased pollution and decreased availability of fuel-efficient vehicles." NRDC Br. 27. The American Fuel & Petrochemical Manufacturers—a trade association representing oil refiners and petrochemical companies—contends that the standards should be more lenient and alleges that its members have been injured because the final rule will decrease consumption of gasoline. Fuel Mfrs. Br. 23-24. And a group of 11 States argues that it will suffer decreased tax revenue because the final rule will reduce the nation's dependence on oil, and that the final rule will place an increased burden on electric grids. *Id.* at 24-25.[5]

A group of trade organizations and companies involved in the biofuels supply chain (the "biofuel intervenors"), including producers of ethanol and biodiesel, moved to intervene in support of the Fuel

[5] For ease of reference, the joint brief of the Fuel Manufacturers and States is referred to as "Fuel Mfrs. Br."

Manufacturers and state petitioners. The biofuel intervenors contend that they and their members are injured because the final rule will reduce the nation's consumption of liquid fuels. Biofuel Intervenors Br. 12-13.

RESPONSE TO FUEL MANUFACTURERS AND STATE PETITIONERS

SUMMARY OF ARGUMENT

I. A. EPCA requires NHTSA to establish fuel-economy standards for each model year at the maximum feasible level that the agency determines manufacturers can achieve without accounting for the fuel economy of dedicated automobiles or the availability of compliance credits. NHTSA did so. The agency first conducted an inventory of the model year 2020 fleet to assess existing fuel-economy levels. It then projected how the fleet could develop in the subsequent years in the case of various regulatory alternatives. In particular, the agency determined what fuel-economy gains automakers could feasibly be required to achieve during the 2024 to 2026 model years even if they were not going to introduce additional alternative-fuel vehicles to comply with EPCA's fuel-economy standards.

The Fuel Manufacturers and state petitioners urge, however, that in determining the pre-existing state of the fleet in model year 2020, NHTSA was required to exclude all alternative-fuel automobiles. That is, instead of using the actual vehicle fleet in the real world as a starting point for its analysis, NHTSA instead needed to create a fictional reference fleet that ignored the existence of alternative-fuel vehicles. Because those vehicles are generally significantly more energy-efficient, the agency would thus systematically understate the fuel economy of the actual existing fleet from which future feasible gains would be measured. As alternative-fuel vehicles become increasingly prevalent, the gap between petitioners' fictional fleet and the actual fleet will continue to widen. And at some point, the actual fleets will already have achieved any fuel-economy standard that NHTSA could set on the basis of feasible improvements to the fictional fleet.

Petitioners' position lacks any foundation in the statute. EPCA requires the agency to establish fuel-economy standards based on a forward-looking determination of the fuel-saving improvements that manufacturers can make to their fleets. The statute specifies factors

that NHTSA shall consider in making that determination and factors that NHTSA may not consider. These requirements and prohibitions constrain NHTSA's consideration of what fuel-saving improvements automakers can implement. Accordingly, in determining the gains that could be achieved during the 2024 to 2026 model years, NHTSA looked to feasible efficiency improvements that could be made without introducing additional alternative-fuel vehicle models. The statute did not, however, compel the agency to predict the maximum feasible average fleet economy in 2026 without regard to the actual fleet economy at the commencement of the period governed by the new standards and to set fuel-economy standards on the basis of fleets that do not exist.

As Congress intended, the fuel-economy standards adopted by the agency reward automakers for efficiency gains in the production of alternative-fuel vehicles without taking into account their ability to produce new alternative-fuel vehicle models. Because NHTSA did not consider automakers' ability to produce new battery-electric vehicles, the fuel-economy standards understate feasible efficiency gains. Accordingly, manufacturers who voluntarily decide to produce such

vehicles continue to receive the benefit of various statutory incentives including compliance credits.

B. NHTSA excluded the extent to which automakers could produce new dedicated automobiles to comply with EPCA's fuel-economy standards. But the agency properly considered battery-electric vehicles that manufacturers were expected to produce even in the absence of NHTSA's amended standards or in model years outside of the regulatory timeframe.

Within model years 2024 to 2026, NHTSA accounted for new dedicated automobiles only to the extent that automakers will produce those vehicles in order to comply with state zero-emission vehicle requirements. NHTSA explained that because manufacturers are expected to produce these dedicated automobiles without regard to EPCA's fuel-economy standards, accounting for the vehicles does not result in standards that are so stringent that automakers would be required to introduce new dedicated automobiles that they would not have otherwise produced. In any event, the agency explained that it would have reached the same result even if it had excluded dedicated

vehicles produced in response to these pre-existing regulatory requirements.

NHTSA also properly accounted for dedicated automobiles that automakers are expected to produce, and compliance credits they are expected to use, in model years outside of 2024 to 2026. Doing so allowed the agency to account for developments in the years following model year 2020 and to assess the long-term impact of the final rule. EPCA does not prohibit NHTSA from modeling the production of new dedicated automobiles outside of the regulatory timeframe. In any event, a sensitivity analysis that excluded consideration of any dedicated automobiles produced or compliance credits used in model years 2023 to 2029—that is, even outside the regulatory timeframe—makes clear that any asserted error was harmless.

C. NHTSA acknowledges that it erred in the manner in which it considered dual-fueled automobiles. However, the rulemaking record is clear that the error had minimal effect on the agency's analysis, and NHTSA accordingly stated that its consideration of the fuel economy of dual-fueled vehicles did not alter its decision about the final standards.

II. Petitioners have demonstrated no ground for setting aside the fuel-economy standards. Even if there were some prejudicial error, however, the appropriate remedy would be remand without vacatur.

First, if the Court remands for NHTSA to reconsider the fuel-economy standards with a different methodology, the record indicates that it is possible, and even likely, that NHTSA would reach the same conclusion.

Second, vacating the final rule would have significant disruptive consequences to the energy-conservation goals underlying EPCA, the environment, and the public health. Moreover, because of the statutory lead-time requirements, vacatur would effectively bar NHTSA from promulgating any new standards concerning the model years at issue. In these circumstances, vacatur would be inappropriate.

STANDARD OF REVIEW

Judicial review of fuel-economy standards established under EPCA proceeds under the standards established by the Administrative Procedure Act. *See Competitive Enter. Inst. v. NHTSA*, 45 F.3d 481, 484 (D.C. Cir. 1995). The Court's review "is limited to determining whether [the regulatory standard] is 'arbitrary, capricious, an abuse of

discretion, or otherwise not in accordance with law.'" *Id.* (quoting 5 U.S.C. § 706(2)(A)).

ARGUMENT

I. NHTSA ESTABLISHED THE FUEL-ECONOMY STANDARDS ON THE BASIS OF THE PRESCRIBED STATUTORY CRITERIA AND BY CONSIDERING MANUFACTURERS' ABILITY TO MEET THE STANDARDS WITHOUT PRODUCING NEW DEDICATED VEHICLES OR USING COMPLIANCE CREDITS

The Fuel Manufacturers and state petitioners demonstrate no prejudicial error in the final rule. First, EPCA does not constrain NHTSA's consideration of the pre-existing fleet and that fleet's actual fuel-economy level. Second, the statute does not prohibit NHTSA from accounting for dedicated automobiles that would be produced even in the absence of NHTSA's new standards or in years outside of the regulatory timeframe. Third, while NHTSA acknowledges that it erred in its consideration of dual-fueled vehicles, that error is harmless because the record makes clear that the agency would have reached the same conclusion under the proper analysis.

A. NHTSA Properly Considered The Entire Existing Fleet In Calculating The Starting Fuel-Economy Level

1. Congress directed the Secretary of Transportation to establish fuel-economy standards for each model year at "the maximum feasible

average fuel economy level that the Secretary decides the manufacturers can achieve in that model year." 49 U.S.C. § 32902(a). In making that determination, the Secretary considers four factors: "technological feasibility, economic practicability, the effect of other motor vehicle standards of the Government on fuel economy, and the need of the United States to conserve energy." *Id.* § 32902(f). The Secretary must therefore consider what fuel-saving technology is (or will be) available and within the financial capacity of automakers to implement in their fleets in furtherance of Congress's energy-conservation goal.

EPCA is "intended to be technology forcing," *Center for Auto Safety v. NHTSA*, 793 F.2d 1322, 1339 (D.C. Cir. 1986), and the Secretary is directed to set standards that require automakers to implement additional technology, to the extent feasible, to improve the fleet's fuel economy. To determine the maximum feasible fuel-economy level that "manufacturers can achieve" in a future "model year," 49 U.S.C. § 32902(a), NHTSA must first ascertain the fuel-economy level that manufacturers have already achieved in previous model years. The pre-existing fuel-economy level is crucial because it marks the

starting point for determining what further efficiency gains will be feasible during the course of the regulatory period. *See* 87 Fed. Reg. at 25,755-25,756 (JA918-919) (The "analysis fleet," or "baseline fleet," "provides a reference from which to project how manufacturers could apply additional technologies to vehicles to cost-effectively improve vehicle fuel economy, in response to regulatory action and market conditions."). To determine this starting point, NHTSA calculates the average fuel economy of all vehicles sold in a given year. In the 2022 rulemaking, NHTSA used the model year 2020 fleet as the analysis fleet because that was the most recent model year for which it had complete data. *Id.* at 25,756 (JA919); TSD 103 & n.51 (JA565 & n.51).

In general, manufacturers can improve the overall fuel economy of their fleet by improving the efficiency of gasoline-powered vehicles and by producing additional dedicated alternative-fuel and dual-fueled automobiles, which attain a higher fuel-economy rating. *See* 49 U.S.C. §§ 32904, 32905(e). In addition, automakers can meet fuel-economy standards by using earned or purchased compliance credits. *See* 49 U.S.C. § 32903.

In considering what gains in fuel economy are feasible and practicable, however, NHTSA does not consider manufacturers' ability to produce new dedicated automobiles or to make use of credits. Although other provisions of the statute encourage the production of alternative-fuel vehicles, Congress did not wish the Secretary to set fuel-economy standards at a level that would require production of those models. The statute thus precludes the Secretary from "consider[ing] the fuel economy of dedicated automobiles" and requires the Secretary to "consider dual fueled automobiles to be operated only on gasoline or diesel fuel" when determining what increases in the fuel-economy standards automakers can feasibly and practicably achieve. 49 U.S.C. § 32902(h)(1)-(2). Similarly, Congress did not want NHTSA's regulations to diminish the benefit of automakers' compliance credits by establishing fuel-economy standards at a level that would require automakers to use those credits, and it directed the Secretary not to consider the availability of credits in setting the standards. *Id.* § 32902(h)(3).

Accordingly, in conducting its standard-setting analysis, NHTSA excluded the possibility that "manufacturers could respond to

[increased fuel-economy] standards by using compliance credits or introducing new [dedicated] alternative fuel vehicle … models" during the years affected by the proposed standards. 87 Fed. Reg. at 25,739 (JA902); *see also* CAFE Model Documentation 33 (JA838) (the CAFE Model does not simulate the application of "[t]echnologies that convert a vehicle to a battery-electric or a fuel-cell vehicle … during [the] 'standard setting' years"). The agency thus determined the maximum feasible fuel economy level based solely on the efficiency gains that manufacturers could practicably achieve without adding new alternative-fuel vehicle models.

2. Petitioners argue that the fuel-economy standards contemplate impermissible levels of energy efficiency and may therefore adversely affect revenues from gasoline sales. In particular, they contend that NHTSA erred in its determination of the fleet fuel economy that had already been achieved before NHTSA even began the rulemaking process.[6] Petitioners urge that NHTSA could not properly consider the fuel economy of the full existing fleet and was, instead, required to

[6] Petitioners' challenges to other aspects of NHTSA's treatment of dedicated and dual-fueled vehicles, as well as the treatment of compliance credits, are discussed below.

exclude from that fleet all dedicated automobiles (in particular, battery-electric vehicles) already being sold.

Although petitioners now contend that NHTSA violated the statute by starting its analysis with the real-world fuel-economy level of the existing fleet, they raised no similar concerns during the 2020 rulemaking in which the agency also used the fuel economy of the entire pre-existing fleet as its starting point. As in this rulemaking, NHTSA's "analysis … include[d] dedicated [alternative-fuel vehicles] that already exist[ed]"—in that rulemaking, in the model year 2017 analysis fleet—"and their projected future volumes." 85 Fed. Reg. at 24,314. NHTSA explained that it gave effect to the limitations of Section 32902(h) by constraining the CAFE Model such that alternative-fuel powertrain technologies, such as battery-electric vehicles, "[we]re not available in the compliance simulation to *improve* fuel economy." *Id.* (emphasis added). The Fuel Manufacturers and state petitioners made no objection to NHTSA's methodology during that rulemaking. *See* Comment from American Fuel & Petrochemical Mfrs. 2, Doc. No. NHTSA-2018-0067-12078 (Oct. 26, 2018), https://www.regulations.gov/comment/NHTSA-2018-0067-12078 ("[American Fuel & Petrochemical

Manufacturers] commends NHTSA for taking a realistic view of consumer acceptance of electrified vehicles, including … battery electric vehicles[.]”); Comment from State of Texas et al. 2, Doc. No. NHTSA-2018-0067-11935 (Oct. 26, 2018), https://www.regulations.gov/comment/NHTSA-2018-0067-11935 (“We … write jointly to express our strong support for the proposed SAFE Vehicles Rule and to urge [NHTSA] and the Environmental Protection Agency to adopt this rule and reform the [Corporate Average Fuel Economy] standards.”). Petitioners understood the statute correctly at that time.

3. Petitioners’ new argument misconstrues Section 32902(h), which limits NHTSA’s considerations in determining how much automakers can improve fuel economy, not NHTSA’s determination of the pre-existing fuel-economy level. The argument is also irreconcilable with the statute’s structure and purpose, and, if accepted, it would largely eliminate NHTSA’s ability to set technology-forcing standards as the statute anticipates.

a. EPCA requires the agency to establish fuel-economy standards based on a forward-looking determination of the fuel-saving improvements that manufacturers can make to their vehicles, and it

directs the agency to set new standards for no more than five model years at a time. 49 U.S.C. § 32902(b)(3)(B). The technology-forcing scheme is thus iterative, requiring NHTSA to repeatedly consider the maximum feasible fuel-economy standards based on an evaluation of what additional improvements could be made to the nation's fleet. With each iteration, NHTSA is directed to set the standards at the "maximum feasible" level that NHTSA determines manufacturers "*can* achieve," *id.* § 32902(a) (emphasis added)—not at a level that has already been achieved.

The four factors set out in Section 32902(f) underscore the agency's forward-looking focus. That subsection identifies the factors that NHTSA must consider in determining how much automakers can improve existing fuel economy; the factors are not relevant to NHTSA's determination of the current fuel-economy level. For example, NHTSA must consider technological feasibility and economic practicability. 49 U.S.C. § 32902(f). Existing fuel-economy levels are necessarily technologically feasible and almost certainly economically practicable. The statute thus directs NHTSA to consider whether manufacturers can feasibly and practicably make additional technological

improvements to achieve higher fuel-economy levels if required to do so. The agency sets prospective standards accordingly and, at the conclusion of each model year encompassed by the standards, compliance is measured on the basis of the manufacturer's entire fleet, including dedicated automobiles.

Section 32902(h) (which cross-references subsection (f)) is similarly directed at NHTSA's consideration of what additional fuel-economy improvements manufacturers can make, not NHTSA's determination of the existing fuel-economy level. Like the statute's other requirements, Section 32902(h) is prospective in application, addressing the concern that manufacturers should not be required to use compliance credits or produce new dedicated automobiles in order to comply with more stringent fuel-economy standards. NHTSA must therefore determine how much (if any) of an increase in the fuel-economy standards manufacturers "can achieve" in response to more stringent fuel-economy standards, 49 U.S.C. § 32902(a), without considering the possibility that automakers would use compliance credits, *see id.* § 32902(h)(3), or introduce additional dedicated automobiles, *see id.* § 32902(h)(1).

b. This regime does not authorize, much less compel, NHTSA to proceed from a deliberately incorrect account of a manufacturer's pre-existing fleet. If NHTSA calculated the pre-existing fuel-economy level based on a fictive fleet stripped of all battery-electric vehicles as petitioners urge, the agency would systematically understate pre-existing fuel-economy levels, thus skewing its assessment of what fuel-economy level could be achieved with additional improvements to gasoline- and diesel-powered vehicles.

Petitioners do not explain how the agency could make reasonable, reality-based determinations under their proposed regime. Indeed, as the percentage of battery-electric vehicles in a fleet increases, petitioners' methodology would increasingly cripple NHTSA's ability to issue meaningful standards that would accurately reflect maximum feasible fuel-economy levels. Under petitioners' regime, NHTSA would have to calculate the pre-existing fuel-economy level based on a fictive fleet, while compliance with new standards would be calculated on the basis of the real fleet. The result at some point would be that manufacturers will already have achieved any fuel-economy standard

that NHTSA could set on the basis of the fictional fleet that would form its starting point.

The problems created by petitioners' proposal are not hypothetical or distant. Electric vehicles are projected to comprise approximately 50% of vehicles sold in the United States by model year 2030.[7] For purposes of illustration, it may be assumed that, at that time, gasoline-powered vehicles will have an average fuel-economy rating of 40 miles per gallon, and battery-electric vehicles will have a rating of 160 miles per gallon. The compliance fuel economy of the real-world fleet would be 100 miles per gallon. Under petitioners' proposed methodology, however, NHTSA would assume that manufacturers were achieving only 40 miles per gallon. If NHTSA then concluded that manufacturers could achieve an additional 10 miles per gallon in fuel efficiency through improvements to their gasoline-powered vehicles, it would set the fuel-economy standard for the following regulatory period at 50 miles per gallon. Because manufacturers would already have achieved

[7] *See* Peter Slowik et al., International Council on Clean Transp., *Analyzing the Impact of the Inflation Reduction Act on Electric Vehicle Uptake in the United States* 12 (Jan. 2023), https://perma.cc/78QC-UYKC.

average fleet fuel economy well above that level, it would be unnecessary for them to make any improvements at all in order to achieve compliance, thus nullifying Congress's fuel-economy program. Indeed, the fuel-economy standards at that point would not even be effective in preventing automakers from downgrading their gasoline-powered vehicles to less expensive and less efficient technology. *See* 87 Fed. Reg. at 26,018 (JA1181).

Congress did not dictate a course that would first reduce and then eliminate NHTSA's obligation to set technology-forcing standards. On the contrary, when Congress created incentives for the production of alternative-fuel vehicles, it explained that those incentives were "not intended to allow manufacturers to relax their efforts to achieve better mileage in the remainder of their fleets that are still fueled with gasoline." H.R. Rep. No. 100-476, at 12 (1987). That would be the consequence of petitioners' construction of the statute: As fleet composition tilts increasingly toward battery-electric vehicles, automakers would never again need to improve the fuel economy of their gasoline-powered vehicles in response to EPCA standards.

c. In contrast, in setting standards in the 2022 rule, NHTSA began with an accurate representation of the model year 2020 fleet. NHTSA then adhered to the statutory scheme of setting fuel-economy standards at a level that will require automakers to improve their fuel economy commensurate with their ability to improve their gasoline-powered vehicles and without requiring them to produce new dedicated vehicle models.

Because NHTSA excluded the ability to produce new battery-electric vehicles from this calculation, the resulting fuel-economy standards understate feasible efficiency gains. NHTSA estimated that in light of manufacturers' ability to voluntarily produce new battery-electric models, the actual total regulatory cost of compliance in the rulemaking timeframe is likely to be $3.4 billion less than the regulatory cost NHTSA projected for purposes of setting the fuel-economy standards (a difference of more than eight percent). *Compare* NHTSA, Final Regulatory Impact Analysis (FRIA), App. II at 339 (Mar. 2022) (JA798) (estimated total regulatory costs of $38.2 billion over model years 2024 to 2026 under the unconstrained real-world analysis), *with* FRIA, App. I at 339 (JA759) (estimated total regulatory costs of

$41.6 billion over model years 2024 to 2026 under NHTSA's standard-setting analysis). As this demonstrates, notwithstanding petitioners' contentions to the contrary, the manner in which NHTSA applied the limitations of Section 32902(h) plainly gives effect to the statutory prohibition. Without those limitations, "compliance with higher standards would appear more cost-effective and, potentially, more feasible." *See* 87 Fed. Reg. at 25,994 (JA1157).[8]

As Congress intended, the fuel-economy standards thus create an incentive for the voluntary production of additional dedicated vehicles rather than compel their production. NHTSA ensured that manufacturers can comply with the revised standards without introducing new alternative-fuel vehicle models. Some manufacturers will likely choose to produce new models of battery-electric vehicles for

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[8] NHTSA performed a real-world analysis of the impact of its regulations in order to prepare an environmental impact statement as required by the National Environmental Policy Act. *See* 42 U.S.C. § 4332(2)(C); *Center for Biological Diversity v. NHTSA*, 538 F.3d 1172, 1212-1215 (9th Cir. 2008). In preparing that statement, NHTSA permitted the CAFE Model to run an analysis unconstrained by the limitations of Section 32902(h), *i.e.*, it allowed the model to simulate the unlimited production of new battery-electric vehicles in model years 2024 to 2026. 87 Fed. Reg. at 25,739 (JA902). NHTSA did not rely on that unconstrained analysis in "making its decision about what levels of standards would be maximum feasible." *Id.* at 25,995 (JA1158).

a variety of reasons, however, and some may find that such production is a less costly means of complying with the fuel-economy standards than applying fuel-saving technology to gasoline-powered vehicles. In this way, manufacturers can realize significant cost savings. And if manufacturers exceed the fuel-economy standards (which were calculated without regard to automakers' ability to produce additional battery-electric vehicles), they will also receive the benefit of compliance credits.

d. Petitioners' additional contentions are unavailing. They stress (Fuel Mfrs. Br. 28-30), for example, that Section 32902(h) uses mandatory terms. The question, however, is what that provision mandates. As discussed, the statute precludes NHTSA from considering the extent to which manufacturers can increase the use of battery-electric vehicles or use compliance credits to meet heightened fuel-economy standards. It does not require NHTSA to disregard the actual composition of existing fleets.

In a similar vein, petitioners point out (Fuel Mfrs. Br. 39-40) that Congress sometimes instructs an agency to make a decision without regard to a particular factor that the agency might otherwise find

relevant. Once again, that begs the relevant question. As NHTSA recognizes, Congress foreclosed consideration of an otherwise relevant factor: the extent to which manufacturers could produce additional dedicated automobiles to comply with the fuel-economy standards. In the absence of Section 32902(h), NHTSA might well find manufacturers' ability to produce new battery-electric vehicle models relevant to the agency's determination of feasibility and practicability. Congress did not, however, implicitly require the agency to adopt an inaccurate account of the fuel economy of a manufacturer's pre-existing fleet. None of the statutes to which petitioners analogize provides any support for their assertion here. *See* Fuel Mfrs. Br. 40.

Petitioners briefly urge (Fuel Mfrs. Br. 38-39) that NHTSA's analysis "does not reflect 'reality' for all manufacturers," an assertion that does not advance their statutory argument. In any event, petitioners are mistaken. NHTSA considered each manufacturer's fleet independently, accounting for the number of dedicated automobiles that each manufacturer was already producing in 2020. *See, e.g.*, FRIA, App. I at 372-388, 461-477 (JA760-776, 778-794) (identifying model year 2020 and future projected electrification rates for each manufacturer

independently). And just as the inputs to the CAFE Model differentiated between manufacturers' different starting fleets, NHTSA also considered the differing impacts that its proposed fuel-economy standards would have on the various manufacturers. *See, e.g.*, 87 Fed. Reg. at 26,015-26,016 (JA1178-1179) (estimating average vehicle price increases separately for each manufacturer). NHTSA's determination that the fuel-economy standards are set at the maximum feasible level that manufacturers can achieve thus accounted for the differences among automakers.

Petitioners repeatedly cite (Fuel Mfrs. Br. 7, 33) a statement from Representative John Dingell on the House floor that the language now in Section 32902(h) was intended to ensure that the incentives for automakers to produce dedicated automobiles are not erased by NHTSA setting the fuel-economy standards "at a level that assumes a certain penetration of alternative fueled vehicles" or by NHTSA "including those incentive increases in the manufacturer's 'maximum fuel economy capability.'" 134 Cong. Rec. 25,124 (1988). As explained, NHTSA's decision-making begins with an actual, not assumed, analysis fleet that accurately represents the battery-electric vehicle models already on the

market. When NHTSA then modeled how automakers could apply technology to comply with more stringent fuel-economy standards in model years 2024 to 2026, it excluded the possibility that they would increase the penetration of battery-electric vehicles to comply with those standards. The agency thus excludes consideration of EPCA's incentives to produce dedicated automobiles when determining the maximum fuel-economy level that manufacturers can achieve. That approach protects the incentives that motivated Representative Dingell's statement. Were NHTSA to consider manufacturers' ability to meet new standards by producing new battery-electric vehicles, it might establish more demanding standards than it has done. *See supra* pp. 41-42; 87 Fed. Reg. at 25,994 (JA1157). In any event, were petitioners' interpretation of Representative Dingell's statement correct, it would be at odds with the House committee report quoted above (*supra* p. 40), which is the "more authoritative" indicator of congressional intent. *Garcia v. United States*, 469 U.S. 70, 76 (1984) (quotation marks omitted).

Petitioners do not salvage their argument by briefly suggesting that NHTSA's construction of the statute creates "major-questions

problems," Fuel Mfrs. Br. 44, which it plainly does not. The statute provides "clear congressional authorization," *West Virginia v. EPA*, 142 S. Ct. 2587, 2609 (2022) (quotation marks omitted), for NHTSA to establish fuel-economy standards, and NHTSA has repeatedly exercised the authority to do so for more than four decades, *see, e.g.*, 42 Fed. Reg. 33,534 (June 30, 1977) (establishing fuel-economy standards for model years 1981 to 1984). *Cf. West Virginia*, 142 S. Ct. at 2610 (the major-questions doctrine applied where an agency had "located [a] newfound power in the vague language of an ancillary provision … that was designed to function as a gap filler and had rarely been used in the preceding decades" (alteration, citation, and quotation marks omitted)).

Nor, contrary to petitioners' assertion (Fuel Mfrs. Br. 43), does NHTSA's understanding of the statute enable it to mandate a "'complete transition' to electric vehicles." Indeed, the final rule explains that Section 32902(h) makes it "more difficult" for NHTSA to facilitate such a transition, and impossible for it to mandate one. 87 Fed. Reg. at 25,994 (JA1157). NHTSA projected that, under the final standards, battery-electric vehicles will comprise only nine percent of passenger cars and three percent of light trucks sold in model year

2026, the final year encompassed by this rule. *Id.* at 26,011-26,012 (JA1174-1175). As explained, NHTSA's model ensures that manufacturers can meet the revised fuel-economy standards without producing any additional battery-electric vehicles. If manufacturers choose to produce additional battery-electric vehicles because it is cost effective to do so, that is a result of the manufacturers' own choices and the statutory incentives that Congress established for producing such vehicles.

4. Finally, in light of the explicit authority vested in the agency to exercise its expertise in setting binding standards, this Court has repeatedly reviewed fuel-economy standards under the framework established in *Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837, 842-843 (1984). *See Public Citizen v. NHTSA*, 848 F.2d 256, 265 (D.C. Cir. 1988) (reviewing fuel-economy standards under the *Chevron* framework); *Center for Auto Safety*, 793 F.2d at 1338 (same). Thus, even assuming that the relevant statutory provisions were ambiguous, the Court would defer to NHTSA's plainly reasonable interpretation of the statute.

B. NHTSA Properly Considered Certain New Battery-Electric Vehicle Models That Automakers Were Expected To Produce After The Model Year 2020 Fleet

As explained above, Section 32902(h) is not relevant to NHTSA's calculation of pre-existing fuel-economy levels. Instead, it constrains the manner in which NHTSA determines how much manufacturers can improve upon those levels by prohibiting the agency from considering the extent to which manufacturers could achieve compliance by producing new dedicated automobiles in the model years being regulated.

In undertaking this calculation, NHTSA did not exclude certain new battery-electric vehicles that automakers were expected to produce even in the absence of NHTSA's new standards or in model years outside of 2024 to 2026. NHTSA's treatment of such vehicles was entirely reasonable, and, in any event, the rulemaking record makes clear that any error was harmless.

1. NHTSA properly accounted for battery-electric vehicles that automakers would produce in response to state regulatory requirements

a. Although NHTSA generally constrained the CAFE Model from simulating the production of new battery-electric vehicles in model years 2024 to 2026, the model accounted for vehicles that manufacturers would produce not in order to meet NHTSA's fuel-economy standards, but to comply with state zero-emission vehicle requirements. NHTSA's inclusion of those vehicles in its modeling was entirely reasonable and lawful. In any event, NHTSA's consideration of the state regulatory programs had no bearing on the fuel-economy standards established by NHTSA's final rule. The agency explained that excluding those programs from its assessment would not have led it "to reach a different conclusion regarding maximum feasible [average fuel-economy] standards." 87 Fed. Reg. at 25,899 (JA1062).

i. California has enacted a zero-emission vehicle program to control the emission of certain pollutants, including greenhouse gases. 87 Fed. Reg. at 25,762 (JA925). That program requires manufacturers who sell vehicles in California to earn a certain number of zero-emission vehicle credits each year. *Id.* at 25,763 & n.112 (JA926 & n.112) (in

2025, manufacturers will need to earn credits equal to 22% of the number of vehicles sold in the State). Automakers earn credits primarily by producing battery-electric vehicles and plug-in hybrid electric vehicles. *Id.* at 25,763 (JA926). At the time of NHTSA's analysis, 11 States other than California had also adopted the zero-emission vehicle program pursuant to authority granted to them under the Clean Air Act. *Id.* at 25,762 (JA925).

NHTSA noted that "nearly all manufacturers have announced some plans to produce [battery-electric vehicles] at a scale meaningful to [those] requirements." 87 Fed. Reg. at 25,764 (JA927); *see also* TSD 131-132 (JA593-594) (identifying new battery-electric vehicles expected to be released between 2021 and 2025); FRIA 21 (JA704). To simulate these developments, NHTSA identified likely pathways to compliance (including through the purchase of state regulatory credits) and specific vehicle models and configurations that manufacturers could replace with battery-electric vehicles to meet the state requirements. *See* 87 Fed. Reg. at 25,763-25,765 (JA926-928); TSD 42 (JA504). The CAFE

Model then applied those anticipated technology upgrades at those vehicle models' first scheduled redesign year. *See* TSD 133 (JA595).[9]

NHTSA explained that modeling manufacturer compliance with these pre-existing legal requirements enabled the agency to make realistic projections of how the nation's vehicle fleet will change in the coming years, which is foundational to NHTSA's ability to set fuel-economy standards that reflect the maximum feasible fuel-economy level achievable through improvements to internal combustion engine vehicles. 87 Fed. Reg. at 25,899 (JA1062). Likewise, by creating a more accurate projection of how manufacturers would modify their fleets even in the absence of revisions to EPCA's fuel-economy standards, NHTSA was able to better "identify the effects of [those] standards." *Id.*; *see also id.* at 25,744 (JA907) (the CAFE Model should account for the "additional legal obligations that automakers will be meeting" during

[9] According to amicus Alliance for Automotive Innovation (Amicus Br. 23 n.16), California's zero-emission vehicle requirements have sometimes been "overly ambitio[us]." NHTSA reasonably found, based partly on manufacturers' announcements of their plans to create new battery-electric vehicles, that manufacturers will meet the planned requirements. 87 Fed. Reg. at 25,764 (JA927). Neither petitioners nor amicus contend that finding was arbitrary or capricious.

the rulemaking time frame “so that the regulatory analysis can identify the distinct effects of the [EPCA fuel-economy] standards”).

As NHTSA explained, the agency’s consideration of state zero-emission vehicle programs is consistent with Section 32902(h). That provision bars the agency from accounting for the possibility that manufacturers will produce additional dedicated vehicles as a means of complying with EPCA’s fuel-economy standards; it does not bar NHTSA from accounting for dedicated vehicles that would be produced even “in the absence of further [fuel-economy] standards.” 87 Fed. Reg. at 25,899 (JA1062).

As explained above, Congress’s intent in enacting the limitations of Section 32902(h) was to prevent NHTSA from promulgating fuel-economy standards that would be so stringent that those standards would require automakers to introduce new dedicated automobiles. *See supra* p. 32. That intent would not be furthered by prohibiting NHTSA from modeling the extent to which automakers intend to introduce new dedicated automobiles due to *other* considerations. To the contrary, failing to accurately reflect the fleet that would exist in the absence of NHTSA’s standards would make it impossible for NHTSA to accomplish

its congressionally mandated task of identifying the maximum feasible fuel-economy level that can be achieved without introducing additional alternative-fuel vehicle models and setting a fuel-economy standard that requires that level of improvement.[10]

The Fuel Manufacturers and state petitioners argue that it was arbitrary and capricious for NHTSA to model automaker compliance with the state programs because a party might "successfully challenge[] any one of those laws." Fuel Mfrs. Br. 44. But NHTSA based its modeling on the status quo, not on the possibility that the state programs—or any other pre-existing legal requirement—might later be invalidated by a court. An agency is required to craft its rule in light of

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[10] For the same reason, the statute would not prohibit NHTSA from accounting for dedicated-automobile models that manufacturers are expected to produce in model years 2024 to 2026 in response to greenhouse gas emission standards or other factors independent of EPCA's fuel-economy standards. NHTSA did not account for these automobiles, however, because of technical limitations with the CAFE Model and to ensure that the model would not simulate the production of any new dedicated automobiles in response to EPCA's fuel-economy standards. Thus, the only battery-electric automobiles that the CAFE Model simulated being introduced in model years 2024 to 2026 were those that NHTSA expects to be created for the purpose of compliance with the state zero-emission vehicle programs. *See* CAFE Model Documentation 33 (JA838). To the extent petitioners suggest otherwise, see Fuel Mfrs. Br. 15-17, 35-36, 37-38, they simply misunderstand how the CAFE Model operated.

the best information available at the time, and an agency's decision must be evaluated "based on the full administrative record that was before the [agency] at the time [it] made [its] decision." *American Wildlands v. Kempthorne*, 530 F.3d 991, 1002 (D.C. Cir. 2008) (quoting *Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402, 420 (1971)). The Administrative Procedure Act does not require an agency "to be prescient." *Walter O. Boswell Mem'l Hosp. v. Heckler*, 749 F.2d 788, 792 (D.C. Cir. 1984). If a rule's underlying factual assumptions (including assumptions about the application of other regulatory requirements) later become incorrect "because the facts have changed, the appropriate avenue for relief is a petition for rulemaking." *Flat Wireless, LLC v. FCC*, 944 F.3d 927, 931 (D.C. Cir. 2019); *see* 49 C.F.R. § 553.11 ("The Administrator may initiate rulemaking … on petition by any interested person[.]"); *General Motors Corp. v. NHTSA*, 898 F.2d 165, 167-168 (D.C. Cir. 1990) (automakers petitioned for NHTSA rulemaking to reduce the fuel-economy standards). The potential for changed circumstances in the future does not render a rule unlawful.

ii. In any event, even assuming NHTSA erred in modeling manufacturers' compliance with the state zero-emission vehicle

programs, the error resulted in no prejudice to petitioners because it did not affect the agency's ultimate decision.

The Administrative Procedure Act provides that the Court shall take "due account … of the rule of prejudicial error." 5 U.S.C. § 706. Under that rule, when an agency makes a mistake, the Court "must reverse and remand only when there is a significant chance that but for the errors the agency might have reached a different result." *Salt River Project Agric. Improvement & Power Dist. v. United States*, 762 F.2d 1053, 1060 n.8 (D.C. Cir. 1985). The Court should sustain the agency's decision "[w]hen it is clear that based on the valid findings the agency would have reached the same ultimate result." *Id.*; *see also Prohibition Juice Co. v. FDA*, 45 F.4th 8, 24 (D.C. Cir. 2022) ("When an agency's mistake plainly 'had no bearing' on the substance of its decision, we do not grant a petition for review based on that mistake."); *PDK Labs. Inc. v. DEA*, 362 F.3d 786, 799 (D.C. Cir. 2004) ("If the agency's mistake did not affect the outcome, if it did not prejudice the petitioner, it would be senseless to vacate and remand for reconsideration."). Of particular relevance here, the Court has held that an agency's sensitivity analysis can effectively demonstrate that an alleged error was harmless. *See*

Appalachian Power Co. v. EPA, 135 F.3d 791, 815 (D.C. Cir. 1998) (per curiam). Petitioners bear the burden of showing that an error is harmful. *Shinseki v. Sanders*, 556 U.S. 396, 409-411 (2009); *Prohibition Juice*, 45 F.4th at 24.

In establishing the fuel-economy standards, NHTSA considered various alternative analyses, including an analysis that did not account for compliance with state zero-emission vehicle programs. 87 Fed. Reg. at 25,899 (JA1062). That is, NHTSA ran the CAFE Model under a setting in which it did not simulate manufacturers creating new battery-electric vehicles to comply with the state programs. That analysis showed that not accounting for the state programs would hardly have affected the agency's evaluation of the final standards. For example, one key indicator of economic practicability is the amount that the fuel-economy standards would be expected to increase future vehicle prices. *See id.* at 26,014 (JA1177) ("If the per-vehicle cost increases seem consistent with those previously found to be economically practicable, … it will seem more likely that the standards causing those increases are economically practicable."). In the alternative analysis in which NHTSA did not account for state zero-emission vehicle programs,

the incremental average cost of a model year 2029 vehicle was $1,133, FRIA 229 (JA725), compared to $1,087 in the main analysis, FRIA 227 (JA723)—a difference of only $46.

Petitioners mistakenly state that the incremental average cost in the analysis where state zero-emission vehicle mandates were not considered was $1,333. Fuel Mfrs. Br. 49 n.15. Petitioners are looking at the wrong column of the applicable chart: Because they cite to the incremental "[r]egulatory cost" in the main analysis, *see* Fuel Mfrs. Br. 49 (using the $1,087 figure); FRIA 227 (JA723) (source of that figure), the appropriate comparator is the incremental regulatory cost in the alternative analysis (not the "[v]ehicle cost," FRIA 229 (JA725)). The incremental regulatory cost under the alternative analysis is $1,133, not $1,333. *See id.*

The final rule explains that the "small differences" between the alternative analysis and the main analysis "were not dispositive for NHTSA in choosing the Preferred Alternative; nor would removing [zero-emission vehicle programs] from the baseline in the main analysis have led NHTSA to reach a different conclusion regarding maximum feasible [average fuel-economy] standards." 87 Fed. Reg. at 25,899

(JA1062). The agency thus made clear that "this is not a situation where consideration of the California [zero-emission vehicle] standards and their adoption by [other] states would change NHTSA's analysis or determination of maximum feasible standards." *Id.* at 25,983 (JA1146).

In sum, "it is clear that … the agency would have reached the same ultimate result," and any error is harmless. *Hermes Consol., LLC v. EPA*, 787 F.3d 568, 579 (D.C. Cir. 2015) (alteration in original) (quotation marks omitted).

b. The biofuel intervenors argue that NHTSA erred in accounting for automakers' anticipated responses to state zero-emission vehicle programs because, they contend, those programs are preempted by EPCA or the Renewable Fuel Standard. Biofuel Intervenors Br. 14-26.

i. As an initial matter, the Court need not and should not address these preemption arguments. First, for the reasons discussed, even if there was error in assuming compliance with state zero-emission vehicle programs, any such error was harmless. *See Prohibition Juice*, 45 F.4th at 25 (declining to resolve an allegation of error where any error would have been harmless).

Second, the Court should not reach these arguments because they were raised by intervenors alone. This Court has made clear that "[i]ntervenors may only argue issues that have been raised by the principal parties; they simply lack standing to expand the scope of the case to matters not addressed by the petitioners in their request for review." *National Ass'n of Regulatory Util. Comm'rs v. Interstate Commerce Comm'n*, 41 F.3d 721, 729 (D.C. Cir. 1994). "[O]nly in 'extraordinary cases' will [the Court] depart from [this] general rule." *Id.* at 730. Absent such a rule "the time limitations for filing a petition for review … could easily be circumvented through the device of intervention." *Illinois Bell Tel. Co. v. FCC*, 911 F.2d 776, 786 (D.C. Cir. 1990).

Those circumvention concerns are evident here. The biofuel intervenors moved to intervene on July 29, 2022, well outside the 59-day statutory time limitation to petition for review. *See* 49 U.S.C. § 32909(b). "By failing to file a timely petition," the intervenors have "forfeited any guarantee to judicial review of [their] claim." *American Fuel & Petrochemical Mfrs. v. EPA*, 937 F.3d 559, 590 (D.C. Cir. 2019) (per curiam).

For their part, petitioners do not raise the preemption issue in their briefs. The Fuel Manufacturers and state petitioners note that a different case pending before this Court raises the issue of whether the state programs are preempted, *see* Fuel Mfrs. Br. 16 n.9 (citing *Ohio v. EPA*, No. 22-1081 (D.C. Cir.)), and they cursorily assert without elaboration that Congress "preempted—under both EPCA itself and the Clean Air Act—States from" mandating electric vehicles, *id.* at 44. They do not argue, however, that NHTSA was required to address preemption in this rulemaking, and they certainly do not urge the Court to address the scope of preemption under EPCA.[11]

Third, commenters argued only that the state zero-emission vehicle programs are preempted by EPCA, not that they are preempted by the Renewable Fuel Standard. *See* Comment from American Fuel & Petrochemical Mfrs. 11-13, Doc. No. NHTSA-2021-0053-1530 (Oct. 26,

[11] Amici also raise several issues not raised by petitioners. *See, e.g.*, Amicus Br. of West Virginia et al. 14-15 (arguing that NHTSA violated the so-called "equal sovereignty doctrine"); Amicus Br. of The Two Hundred for Homeownership et al. 12-22 (arguing that NHTSA's standards impose disparate consequences on certain populations). The Court need not, and should not, address those issues. *See CSX Transp., Inc. v. Surface Transp. Bd.*, 754 F.3d 1056, 1064 (D.C. Cir. 2014); *Narragansett Indian Tribe v. National Indian Gaming Comm'n*, 158 F.3d 1335, 1338 (D.C. Cir. 1998).

2021), https://www.regulations.gov/comment/NHTSA-2021-0053-1530. At the very least, therefore, intervenors have forfeited any arguments concerning the Renewable Fuel Standard. *See Advocates for Highway & Auto Safety v. Federal Motor Carrier Safety Admin.*, 429 F.3d 1136, 1150 (D.C. Cir. 2005) ("[A] party will normally forfeit an opportunity to challenge an agency rulemaking on a ground that was not first presented to the agency for its initial consideration.").

ii. In any event, for the reasons discussed, NHTSA acted properly in accounting for conditions as they existed at the time of the rulemaking. As the agency noted with regard to California's zero-emission vehicle program in particular, "EPA ha[d] granted a waiver of Clean Air Act preemption to California" for the program. 87 Fed. Reg. at 25,744 (JA907). The program's standards are therefore "real and would be in force whether or not NHTSA increased the stringency of the [fuel-economy] standards." *Id.* at 25,899 (JA1062). The agency explained that "there has been extensive industry overcompliance with the [zero-emission vehicle] standards, which suggests that regardless of" the legal status of those standards, "many companies intend to produce [zero-emission vehicles] in volumes comparable to what the

current [state programs] would require." *Id.* at 25,744 (JA907). Indeed, "nearly all manufacturers have announced some plans to produce [battery-electric vehicles] at a scale meaningful to future [state zero-emission vehicle] requirements." *Id.* at 25,764 (JA927); *see also* TSD 130-132 (JA592-594).

NHTSA explained that it "is not taking a position on whether or not [state zero-emission vehicle] programs are preempted under EPCA, nor does NHTSA even have authority to make such determinations with the force of law." 87 Fed. Reg. at 25,983 (JA1146). Even if the agency had concluded that the state laws were preempted, that conclusion would not alter the laws' current impact; manufacturers would continue to organize their conduct and design their fleets around those programs at least until they were held invalid by a court. *See id.* at 25,899 (JA1062) (States "are free to enforce the [zero-emission vehicle] mandate, and manufacturers are building [zero-emission vehicles] in response to it."). Thus, NHTSA's views on preemption were irrelevant to the issue at hand.

Intervenors underscore the error of their arguments by relying on cases holding that an agency must generally consider the legality of its

own chosen regulatory action. *See* Biofuel Intervenors' Br. 22, 25. There is no doubt that NHTSA had an obligation to consider whether its own conduct comported with the law. But it had no obligation, or authority, to rule on the validity of a regulatory scheme enacted by the States. Indeed, intervenors' position is not logically limited to NHTSA's consideration of the validity of the state zero-emission vehicle programs; it would require NHTSA to independently judge the legality of any existing law that could bear upon its projections, such as those relating to tax credits or labor agreements.

Intervenors argue that NHTSA's reasoning is "incoherent" because NHTSA "*has* taken a position" on the programs' "legal validity." Biofuel Intervenors Br. 23. NHTSA in fact declined to take such a position, *see* 87 Fed. Reg. at 25,983 (JA1146), and its statement that the state programs "are legal obligations applying to automakers," *id.*, simply reflects the reality that the state laws remain on the books and that NHTSA has no authority to set them aside.

Intervenors fare no better by arguing (Biofuel Intervenors Br. 24-25) that NHTSA has previously opined that EPCA preempts state greenhouse gas emission standards. *See* 84 Fed. Reg. 51,310, 51,313

(Sept. 27, 2019). In December 2021, NHTSA finalized a rule that repealed the agency's regulations concerning preemption, explaining that the agency "lacked authority to dictate the scope of EPCA preemption." 86 Fed. Reg. 74,236, 74,238 (Dec. 29, 2021). NHTSA has thus not "flip[ped] positions" in the present rulemaking, Biofuel Intervenors Br. 25, but rather adhered to its position of *not* opining on the scope of EPCA preemption. *See* 87 Fed. Reg. at 25,983 (JA1146) ("NHTSA's substantive position on [zero-emission vehicle] mandates has not changed" since the December 2021 final rule.). NHTSA did not reopen its position on EPCA preemption in the present rulemaking, and intervenors cannot challenge that position here. *See National Mining Ass'n v. United States Dep't of the Interior*, 70 F.3d 1345, 1351 (D.C. Cir. 1995) (an agency's consideration of one rule does not, by itself, reopen related rules for purposes of judicial review).

2. NHTSA properly accounted for battery-electric vehicles that automakers would produce, and compliance credits they would use, outside of the rulemaking timeframe

In determining the feasibility of the proposed fuel-economy standards, NHTSA allowed the CAFE Model to simulate the extent to which automakers would be expected to produce additional battery-

electric vehicles or use compliance credits in the years leading up to and following the years for which NHTSA was amending the fuel-economy standards. That approach was fully consistent with Section 32902(h), and, as with the agency's consideration of battery-electric automobiles manufactured to comply with state standards, its analysis of years outside the model years at issue did not affect NHTSA's ultimate decision about the appropriate fuel-economy standards.

a. First, NHTSA accounted for developments between 2020 and 2024 in order to update information regarding existing levels of fleet fuel economy. As explained, the CAFE Model started with data from the model year 2020 fleet because that was the most recent data set that was reasonably complete. But by the time NHTSA issued the final rule in May 2022, manufacturers were only months away from releasing model year 2023 vehicles. *See* 87 Fed. Reg. at 25,730 (JA893) ("[Model year] 2023 begins in October 2022."). Accordingly, NHTSA modeled developments in model years 2021 through 2023 in order to obtain a more accurate understanding of the state of the fleet entering model year 2024, the first model year governed by the final rule's standards.

Second, although the final rule established fuel-economy standards only for model years 2024 to 2026, NHTSA modeled the fleet over a longer term to assess the long-term impact of the model year 2024 to 2026 standards. *See* 87 Fed. Reg. at 25,725 (JA888). For model years 2027 and later, NHTSA again allowed the CAFE Model to simulate the possibility that manufacturers would introduce new battery-electric vehicles or use compliance credits. *See* CAFE Model Documentation 33 (JA838) (the restrictions on the application of dedicated-vehicle technology and use of compliance credits were imposed only during the "standard setting" years). This approach allowed NHTSA to more accurately model how automakers could further change their fleets after achieving compliance with the revised fuel-economy standards in model years 2024 to 2026, and it allowed NHTSA to project the long-term price, fuel-savings, and public health and safety impacts of the rule. NHTSA's approach thus improved the accuracy of its projections about the state of the nation's vehicle fleet and the consequences of regulatory action. *See* 87 Fed. Reg. at 25,996 (JA1159) ("[T]he wider NHTSA applies the[] constraints [of Section 32902(h)], the more it is forced to divorce its analysis from reality."); *cf.*

Natural Res. Def. Council, Inc. v. Herrington, 768 F.2d 1355, 1385 (D.C. Cir. 1985) ("[W]e will defer to an agency's judgment to use a particular model if the agency examines the relevant data and articulates a reasoned basis for its decision.").

NHTSA explained that EPCA does not prohibit it from modeling the production of new dedicated automobiles or the use of compliance credits in years outside of the regulatory timeframe. 87 Fed. Reg. at 25,995-25,996 (JA1158-1159). The statute requires NHTSA to set the fuel-economy standards for a particular model year at the "maximum feasible average fuel economy level that the Secretary decides the manufacturers can achieve in that model year." 49 U.S.C. § 32902(a). As discussed, NHTSA ensured that the fuel-economy improvements in model years 2024 to 2026 are achievable without relying on new battery-electric vehicles or compliance credits in those years. The statute does not then prohibit NHTSA from lifting the constraints of Section 32902(h) as it models automakers' likely decisions in other years so that it can best update the reference fleet or evaluate the long-term impacts of the rule.

The Fuel Manufacturers and state petitioners mistakenly argue that "NHTSA's modeling shows that manufacturers cannot feasibly meet the standards in model year 2026." Fuel Mfrs. Br. 38 n.13. They base this argument on charts showing that NHTSA estimates that the fleet-wide average fuel economy in model year 2026 will fall short of the standards by 0.7 miles per gallon. *Compare* 87 Fed. Reg. at 25,916 (JA1079) (Table V-6, Alternative 2.5), *with id.* at 25,918 (JA1081) (Table V-12, Alternative 2.5). Petitioners draw the wrong conclusion from those charts. NHTSA's model, consistent with longstanding practice, accounts for the fact that some manufacturers may choose not to comply with the fuel-economy standards in model year 2026 because it would be more cost effective to pay civil penalties. *See id.* at 25,748 (JA911); *see also* 85 Fed. Reg. at 24,272 (2020 rulemaking assumed manufacturers may choose to pay civil penalties where that was cost effective). That does not mean that the standards are not feasible, only that certain manufacturers may elect not to meet them when they otherwise could.

Relatedly, amicus Alliance for Automotive Innovation errs in arguing (Amicus Br. 24-25) that NHTSA's model uses "increased

battery-electric vehicle sales after [model year] 2026 … for compliance in [model year] 2024 through [model year] 2026." NHTSA's model did not allow manufacturers to apply any compliance credits to model years 2024 to 2026, however. *See, e.g.*, 87 Fed. Reg. at 25,739 (JA902) ("[T]he 'standard setting' analysis[] … sets aside the potential that manufacturers could respond to standards by using compliance credits … during the 'decision years' (for this document, 2024, 2025, and 2026)."); CAFE Model Documentation 104 (JA869). Accordingly, the sales of battery-electric vehicles in 2027 to 2029 could not, in the CAFE Model, be used to achieve compliance with the standards for 2024 to 2026.[12]

b. Even assuming that NHTSA erred in considering how automakers are expected to create new battery-electric vehicles or use compliance credits outside of model years 2024 to 2026, any such error was harmless. *See supra* pp. 56-57. The final rule demonstrates that, when deciding on the final standards, NHTSA focused on the effects of the standards during model years 2024 to 2026. *See* 87 Fed. Reg. at

[12] Any suggestion to the contrary in footnote 185 of the final rule does not accurately represent the model and is in error. *See* 87 Fed. Reg. at 25,782 n.185 (JA945 n.185).

26,002-26,024 (JA1165-1187). For example, NHTSA considered the estimated change in application rates of certain technologies through model year 2026. *See id.* at 26,009-26,012 (JA1172-1175). And in considering the estimated average price increase of vehicles—an important measure of economic practicability (*see supra* p. 57)—NHTSA focused on price increases in model year 2024 to 2026 vehicles. *See* 87 Fed. Reg. at 26,015-26,017 (JA1178-1180). Because the CAFE Model did not simulate manufacturers producing new battery-electric vehicles in order to comply with the standards or using credits during those model years, the core of NHTSA's analysis was unaffected by the alleged error.

NHTSA also ran a sensitivity analysis in which it constrained the CAFE Model from creating any new dedicated automobiles or using any compliance credits throughout model years 2023 to 2029 (except as necessary to simulate compliance with the state zero-emission vehicle programs). 87 Fed. Reg. at 25,996 (JA1159). That sensitivity analysis confirms the insignificance of any alleged error. The analysis showed that, under petitioners' desired approach, the adopted standards would cause average model year 2026 vehicle prices to increase by

approximately $1,371; in the main analysis, those prices increased by $1,216. *Compare* NHTSA, *2023-2029 Sensitivity Analysis Consumer Costs Report*, row 1210, col. K, *with* 87 Fed. Reg. at 26,016 (JA1179).[13] Although vehicle prices increased more under the sensitivity analysis, the increase was still substantially less than the $1,574 price increase that NHTSA stated was only "slightly beyond the level of economic practicability." 87 Fed. Reg. at 26,003 (JA1166); *see id.* at 26,016 (JA1179) (regulatory alternative three would have caused average price increases of $1,574). The sensitivity analysis also showed that, even applying the limitations of Section 32902(h) beyond model years 2024 to 2026, the final standards would produce aggregate monetized net benefits to society of over $12 billion. FRIA 226 (JA722).

[13] The *2023-2029 Sensitivity Analysis Consumer Costs Report* is located at ss_2023-2029/reports-csv/consumer_costs_report.csv within the ss_2023-2029.zip file located at https://www.nhtsa.gov/file-downloads?p=nhtsa/downloads/CAFE/2022-FR-LD-2024-2026/Sensitivity%20Analysis/output/ (last updated Jan. 19, 2023). Petitioners erroneously state (Fuel Mfrs. Br. 64-65) that the sensitivity analysis shows an increase in the incremental cost of vehicles from $1,087 to $1,371. But that compares the incremental cost for model year 2026 vehicles under the sensitivity analysis with the incremental cost for model year 2029 vehicles under the main analysis. The incremental cost for model year 2029 vehicles under the sensitivity analysis is $1,264. *See 2023-2029 Sensitivity Analysis Consumer Costs Report*, *supra*, row 1237, col. K.

Given the relatively small increase in incremental vehicle costs and the substantial net benefits even under the sensitivity analysis, the Fuel Manufacturers cannot show that NHTSA would not have deemed the same standards to be the maximum feasible even if it had applied the limitations in Section 32902(h) outside of model years 2024 to 2026.

C. NHTSA Acknowledges That It Erred In Accounting For The Fuel Economy Of Plug-In Hybrid Electric Vehicles, But That Error Was Harmless

Plug-in hybrid electric vehicles are "dual fueled automobiles" under EPCA because they operate on both an alternative fuel (electricity) and gasoline. *See* 49 U.S.C. § 32901(a)(9).[14] The statute provides that, when setting fuel-economy standards, NHTSA "shall consider dual fueled automobiles to be operated only on gasoline or diesel fuel." *Id.* § 32902(h)(2). However, in assessing whether manufacturers could introduce new plug-in hybrids to comply with amended fuel-economy standards in model years 2024 to 2026, NHTSA

[14] The battery pack of a plug-in hybrid can be charged from an outside source of electricity. 87 Fed. Reg. at 25,809 (JA972). A non-plug-in hybrid electric vehicle is not a dual-fueled automobile under the statute because its battery cannot be charged from an external power source; rather, the battery is charged from the energy produced by the combustion of gasoline.

erroneously considered the combined electric and gasoline fuel economy of those vehicles.[15]

Nevertheless, this is a case in which "it is clear that … the agency would have reached the same ultimate result" had it properly accounted for the fuel economy of plug-in hybrids. *Salt River Project*, 762 F.2d at 1060 n.8.

In response to comments, NHTSA conducted a sensitivity analysis that treated plug-in hybrids "as operating on gasoline only" during model years 2024 to 2026. FRIA 251 (JA747). The sensitivity case "result[ed] in minimal changes to total costs and benefits" with net

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[15] NHTSA's error stems from a discussion in the agency's 2012 rulemaking. 77 Fed. Reg. 62,624 (Oct. 15, 2012). At that time, the statute provided for a favorable method of calculating the fuel economy of dual-fueled automobiles manufactured through 2019 for compliance purposes, but not for model years thereafter. *See* 49 U.S.C. § 32905(b) (2012). NHTSA reasoned that once the compliance incentive ended, Section 32902(h)(2)'s standard-setting limitation no longer served a purpose. 77 Fed. Reg. at 63,019-63,020. Accordingly, for model years after 2019, NHTSA considered the fuel economy of plug-in hybrids without restriction. *Id.* at 63,020. In 2014, however, Congress amended the relevant statute to provide a method for calculating the fuel economy of electric dual-fueled automobiles manufactured after model year 2015. Pub. L. No. 113-291, § 318, 128 Stat. 3292, 3341-3342 (2014); *see* 49 U.S.C. § 32905(e). In the 2022 final rule, NHTSA erroneously relied on the outdated reasoning of the 2012 rulemaking, failing to account for the 2014 amendment to the statute. *See* 87 Fed. Reg. at 26,041 (JA1204).

benefits actually increasing by $4 billion compared to the main analysis. *Id.* The CAFE Model further projected that, instead of producing the more expensive plug-in hybrids, manufacturers would improve fuel economy by relying more on non-plug-in hybrid-electric vehicle technology, high compression ratio engines, advanced cylinder deactivation, and higher levels of mass reduction. *Id.* Thus, in the sensitivity case, per-vehicle cost increases attributable to the final fuel-economy standards were actually smaller than in the main analysis. *See* 87 Fed. Reg. at 25,996 (JA1159) (estimating model year 2029 per-vehicle cost increases of $1,072 compared to $1,087 in the main modeling scenario). The final standards may therefore appear even more economically practicable under the sensitivity analysis.

Having examined these results, NHTSA "conclude[d] that even if [it] had run [the] standard setting [scenario] with this restriction"—*i.e.*, considering plug-in hybrids as operating only on gasoline—"the extremely small differences in results would not have led [the agency] to change [its] decision about how [it was] balancing the statutory factors or what levels of fuel economy would be maximum feasible in the rulemaking time frame." 87 Fed. Reg. 25,996 (JA1159). Given the

agency's calculations, its express statement that it would have reached the same decision even under the alternative analysis was well supported. As such, petitioners cannot meet their burden of showing that the error was prejudicial. *See Appalachian Power Co.*, 135 F.3d at 815 (an agency's sensitivity analysis can demonstrate that consideration of a particular factor did not alter the agency's conclusion).

The Fuel Manufacturers and state petitioners argue that NHTSA's sensitivity analysis did not comport with the statute, urging (Fuel Mfrs. Br. 60) that the sensitivity analysis did not "remove[] *all* plug-in hybrids from the model" and only "prevented the model from adding plug-in hybrids '*during the rulemaking time frame*.'"

As an initial matter, petitioners apparently misunderstand the sensitivity analysis, and the statute's requirements. The sensitivity analysis did not remove any plug-in hybrid electric vehicles, nor did it prevent manufacturers from adding new plug-in hybrids during model years 2024 to 2026. Rather, consistent with the statute, it considered the fuel economy of all plug-in hybrid electric vehicles as if the vehicles were operating only on gasoline during model years 2024 to 2026. *See*

FRIA 251 (JA747); *see* 49 U.S.C. § 32902(h)(2) (the Secretary "shall consider dual fueled automobiles to be operated only on gasoline or diesel fuel"). Furthermore, NHTSA acted properly in considering the actual fuel-economy levels of plug-in hybrids for model years other than 2024 to 2026 because, as explained above, the limitations on NHTSA's considerations in Section 32902(h) apply only to NHTSA's determination of the maximum feasible fuel-economy level that manufacturers can achieve in the model years for which NHTSA is setting standards. *See supra* pp. 65-70.

Petitioners also argue (Fuel Mfrs. Br. 61) that the sensitivity analysis did not comport with the limitations of Section 32902(h) because the CAFE Model "responded in part" to the limitation on plug-in hybrids' fuel economy "by adding more electric vehicles." Petitioners' understanding is again incorrect. As explained above, the CAFE Model did not allow manufacturers to produce new battery-electric vehicles in model years 2024 to 2026 (except when manufacturers were doing so to comply with state zero-emission vehicle programs), and that was true even in the sensitivity case. Any increase in battery-electric vehicles may have followed from manufacturers adding new battery-electric

vehicles in model years 2027 to 2029, which NHTSA was permitted to consider. *See supra* pp. 65-70.

II. Even If There Were Any Prejudicial Error, The Proper Remedy Would Be Remand Without Vacatur

For the reasons discussed, petitioners and intervenors have demonstrated no ground for setting aside the challenged fuel-economy standards. Were the Court to conclude, however, that some part of the rule warranted remand, it would be proper to remand without vacatur.

This Court has long recognized that a rule found to be arbitrary and capricious or contrary to law "need not necessarily be vacated." *Allied-Signal, Inc. v. United States Nuclear Regulatory Comm'n*, 988 F.2d 146, 150 (D.C. Cir. 1993); *see also Susquehanna Int'l Grp. v. SEC*, 866 F.3d 442, 451 (D.C. Cir. 2017) (remanding without vacating an order found to be "arbitrary and capricious, unsupported by substantial evidence, and otherwise not in accordance with law"). The decision whether to vacate depends on (1) "the seriousness of the order's deficiencies (and thus the extent of doubt whether the agency chose correctly)" and (2) "the disruptive consequences of an interim change that may itself be changed." *Allied-Signal*, 988 F.2d at 150-151 (quoting *International Union, United Mine Workers v. Federal Mine*

Safety & Health Admin., 920 F.2d 960, 967 (D.C. Cir. 1990)). Remand without vacatur is appropriate where it is "conceivable" that the agency may remedy the defects identified and reach the same result on remand and where vacating the rule while the agency tries again might impose significant disruption. *Id.*

Both of the *Allied-Signal* factors would support remand without vacatur in this case. With regard to the first factor, petitioners and intervenors do not dispute NHTSA's authority to establish average fuel-economy standards, nor its authority to establish those standards at the levels set in the final rule. They argue only that NHTSA considered impermissible factors in setting those standards. It is thus "conceivable" that the agency could correct any error by undertaking a new analysis and still arrive at the same conclusion as to the maximum feasible average fuel-economy level. Where, as here, a statute confers "broad discretionary authority" on an agency and there is "at least a realistic possibility" that the agency will be able to substantiate its decision on remand, vacatur is unwarranted. *Clean Wis. v. EPA*, 964 F.3d 1145, 1177 (D.C. Cir. 2020) (quotation marks omitted); *see also Susquehanna Int'l Grp.*, 866 F.3d at 451 (remanding without vacatur

where the agency "may be able" to reach the same conclusion "after conducting a proper analysis on remand"); *Heartland Reg'l Med. Ctr. v. Sebelius*, 566 F.3d 193, 198 (D.C. Cir. 2009) ("When an agency may be able readily to cure a defect in its explanation of a decision, the first factor in *Allied-Signal* counsels remand without vacatur.").

Indeed, it is much more than "conceivable" that NHTSA would reach the same result on remand. Even assuming that the sensitivity analyses that NHTSA conducted do not demonstrate that any error was harmless, they certainly demonstrate a substantial likelihood that NHTSA would find the same standards to be appropriate even under an alternative analysis that excludes any considerations deemed improper. As explained above, those sensitivity analyses demonstrated that correcting the alleged errors would have had little impact on the economic practicability of the standards that NHTSA adopted. *See supra* pp. 57-59, 70-73, 74-76.

With regard to the second *Allied-Signal* factor, vacatur of the final rule would have significant disruptive consequences. Vacatur would reinstate the fuel-economy standards established in the 2020 rulemaking—standards that NHTSA has determined do not meet the

statutory requirement of being set at "the maximum feasible average fuel economy level that … manufacturers can achieve," 49 U.S.C. § 32902(a). *See* 87 Fed. Reg. at 25,730 (JA893); *United Steel v. Mine Safety & Health Admin.*, 925 F.3d 1279, 1287 (D.C. Cir. 2019) (court order vacating an amendment to existing health and safety standards would "*automatically* resurrect[]" the prior standards). As NHTSA explained, the standards established in the 2020 rulemaking would have "serious adverse effects on energy conservation." 87 Fed. Reg. at 25,730 (JA893). Reverting to those standards would increase gasoline consumption by approximately 60 billion gallons and greenhouse gas emissions by more than 600 million tons. *See id.* at 25,736, 25,738 (JA899, 901).

"As a general rule," the Court does not vacate regulations "when doing so would risk significant harm to the public health or the environment." *Wisconsin v. EPA*, 938 F.3d 303, 336 (D.C. Cir. 2019) (per curiam). Indeed, this Court has "frequently remanded without vacating when a rule's defects are curable and where vacatur would at least temporarily defeat the enhanced protection of the environmental values covered by the [agency] rule at issue." *United States Sugar*

Corp. v. EPA, 844 F.3d 268, 270 (D.C. Cir. 2016) (per curiam) (alterations and quotation marks omitted).

Vacating the 2022 final rule would be particularly anomalous because the 2020 rule employed some of the same methodologies that petitioners allege were unlawfully used in the 2022 rule. Most significantly, as explained above, the 2020 rule, like the 2022 rule, also accounted for the fuel economy of pre-existing battery-electric vehicles. *See supra* p. 34.

Furthermore, because the statute requires NHTSA to promulgate any rule increasing the stringency of fuel-economy standards at least 18 months before the beginning of the model year to which the standards apply, 49 U.S.C. § 32902(g)(2), vacatur would effectively bar NHTSA from conducting further rulemaking with regard to at least some (and likely all) of the model years at issue here.[16] In such circumstances, where vacating a rule would prevent an agency from promulgating new regulations concerning the time period at issue, the Court has declined

[16] In order to establish standards for model year 2026 that were more stringent than those set in the 2020 rule, NHTSA would need to promulgate a rule by spring 2024. *See* 87 Fed. Reg. at 25,730 (JA893). Depending on the timing of the Court's decision, it may well be impossible for NHTSA to meet that deadline.

to order vacatur. *See Davis Cnty. Solid Waste Mgmt. v. EPA*, 108 F.3d 1454, 1458-1459 (D.C. Cir. 1997) (per curiam) (declining to vacate emissions standards where doing so would "permanently lower the emissions limits applicable to some" municipal waste combustors and "result in significantly greater pollution emissions"); *Allied-Signal*, 988 F.2d at 151 (declining to vacate an agency's regulatory program where the agency would have had to pay refunds and could not have regulated retroactively).

In contrast, if the Court remands without vacatur, and NHTSA ultimately decides that less stringent fuel-economy standards are warranted, the agency would be free to issue such a rule because the statute's 18-month lead-time requirement applies only to rules establishing new fuel-economy standards or making existing standards more stringent. *See* 49 U.S.C. § 32902(a), (g)(2). And if automakers had already designed and produced more fuel-efficient vehicles in the meantime, they would receive compliance credits that could be used to offset their obligations in future years.

In short, even assuming that remand were warranted with regard to some part of the 2022 rule, any deficiencies in the final rule are

curable on remand, and vacatur would permanently prevent NHTSA from amending the fuel-economy standards at issue, causing substantial harm to the fuel-conservation policy underlying EPCA, the environment, and the public health. If the Court were to find any prejudicial error in the final rule, it should remand to NHTSA without vacatur.

RESPONSE TO NRDC PETITION

FURTHER STATEMENT OF THE CASE

NHTSA considered dozens of available technologies when determining what level of fuel economy is the maximum feasible that automakers can achieve. *See supra* p. 15. Three of those technologies fit within the general category of high compression ratio engines. As explained below, such engines "achieve a higher level of fuel efficiency" by implementing what is known as an Atkinson cycle, which allows less fuel to be used to do the same amount of work. 87 Fed. Reg. at 25,786 (JA949). But they achieve this fuel efficiency at the expense of power density. TSD 188 (JA650). Accordingly, NHTSA determined that high compression ratio engines cannot be implemented feasibly in pickup trucks and other vehicles with high power demands. Since the CAFE

Model is designed to simulate manufacturers' possible real-world behavior, NHTSA constrained the model from simulating the application of high compression ratio engines in those vehicles. 87 Fed. Reg. at 25,789 (JA952).

1. A brief overview of these technologies is helpful to understanding NHTSA's decision-making.

a. An internal combustion engine consists of several fixed cylinders and moving pistons. K.C. Colwell, *Here's How Your Car's Engine Works*, Car and Driver (Apr. 17, 2019), https://perma.cc/HN9B-9VJ5 (*Engine*). At the top of each cylinder are an intake valve, through which a mixture of air and gasoline is introduced into the cylinder; a spark plug that ignites the air-fuel mixture; and an exhaust valve, through which the spent air-fuel mixture is expelled. *See id.* The pistons move up and down inside the cylinders and are connected via rods to a crankshaft, which in turn powers the car's drive wheels. *Id.*

Historically, most gasoline-based internal combustion engines have utilized the four-stroke Otto cycle, in which the piston completes four separate strokes to achieve each power cycle. 87 Fed. Reg. at 25,786 & n.214 (JA949 & n.214). The four-stroke Otto cycle begins with

the piston at the top of the cylinder. During the first stroke (intake), the intake valve is opened, and the piston moves down the cylinder, drawing a mixture of air and fuel into the combustion chamber. *Engine*, *supra*. When the piston reaches the bottom of its stroke, the intake valve is closed, effectively sealing the combustion chamber. *Id.* The piston then makes its second stroke (compression), moving up the cylinder and compressing the air-fuel mixture. *Id.* As the piston reaches the top of its stroke, the spark plug ignites the compressed air-fuel mixture, which forcefully pushes the piston back down the cylinder. *Id.* This third stroke (the expansion or power stroke) produces mechanical work from the engine to turn the crankshaft. *Id.* Finally, the exhaust valve is opened, and the piston completes a fourth stroke (exhaust) by moving up the cylinder and expelling the spent air-fuel mixture from the cylinder. *Id.* This entire process occurs in milliseconds and can occur thousands of times per minute.

One downside of the Otto cycle is that it fails to use a significant amount of the energy generated by combustion. When the spark plug ignites the air-fuel mixture, the combustion process creates heat, expanding the gasses in the cylinder, pushing the piston downward, and

producing usable power. But the expansion stroke in the Otto cycle (which is necessarily the same length as the compression stroke) is not long enough to capture all of this usable energy, and working pressure remains in the cylinder at the end of the expansion stroke. When the exhaust valve opens, that working pressure or usable energy is pushed out the exhaust valve. *See* Robin Warner, *What Is an Atkinson Cycle Engine? Autoweek Explains*, Autoweek (Oct. 9, 2017), https://perma.cc/A6AH-4UTM.

There is a helpful diagram of the four-stroke Otto cycle at *Four Stroke Cycle*, Encyclopedia Britannica, https://perma.cc/WT5T-X889.

b. Automakers can improve on the efficiency of the Otto engine by utilizing an alternate combustion cycle known as the Atkinson cycle. *See* TSD 188 (JA650). The Atkinson cycle is characterized by an expansion stroke that is effectively longer than the compression stroke. *See id.*; Don Sherman, *What Is the Atkinson Combustion Cycle, and What Are Its Benefits*, Car and Driver (Aug. 4, 2016), https://perma.cc/JA7Y-2RKG (*Atkinson*).

Modern engines implement the Atkinson cycle by keeping the intake valve open during some portion of the compression stroke. TSD

188 (JA650). Suppose that, following the intake stroke, the intake valve remains open for 20% of the compression stroke. During the beginning of that stroke, instead of compressing the air-fuel mixture, the rising piston will push a portion (20%) of that mixture back out through the intake valve into the intake manifold (from which it will reenter the cylinder in the following intake stroke). The intake valve then closes, and the piston compresses the remaining 80% of the air-fuel mixture during the remaining portion of the compression stroke. The spark plug detonates the air-fuel mixture, and the piston is pushed down the entire length of the cylinder in the expansion stroke. *See Atkinson*, *supra*.

In this example, the piston has achieved the same expansion stroke with only 80% of the fuel. The expansion stroke is effectively longer than the compression stroke—or, to be more precise, it is longer than the length of the compression stroke during which the piston is actually compressing the air-fuel mixture. The pressure in the chamber at the end of the expansion stroke is therefore closer to atmospheric pressure, and there is less usable energy left in the chamber when the exhaust valve is opened. *See* TSD 188 (JA650).

The Atkinson cycle has its own drawbacks, however. Most notably, an engine utilizing that cycle will suffer from "a significant reduction in power density." TSD 188 (JA650); *see also Atkinson*, *supra* (the Atkinson cycle suffers "some loss of low-speed [power] output"). Because the engine combusts less fuel in each cycle, the piston is driven down the cylinder with less force, leading the engine to create less power. TSD 188 (JA650).

c. Automakers have some ability to balance the tradeoff between the fuel efficiency of the Atkinson cycle and the power density of the Otto cycle with variable valve timing. *See* TSD 189 (JA651). To demonstrate, consider the engine in the example above. When the engine needs more power, the engine's computer control unit might close the intake valve earlier—say after only 15% of the compression stroke instead of 20%—resulting in less air-fuel mixture being pushed out through that valve, more air-fuel mixture remaining in the chamber at combustion, and greater power density. *Id.* When the engine needs less power, the control unit might delay closing the intake valve a little longer, resulting in less air-fuel mixture being combusted and greater fuel savings. *Id.*

There is a limit, however, to how much the engine can adjust the valve timing. This is because the piston must put the air-fuel mixture under the proper amount of pressure as the piston nears the top of the compression stroke and the spark plug fires. If the intake valve closes nearer to the full capacity of the cylinder (in an effort to create more power) and too much air-fuel mixture remains in the chamber, the compression stroke will over-compress that mixture, potentially leading the mixture to auto-ignite before the spark plug fires. Such auto-ignition is called engine "knock," and it can disrupt the precise timing needed for an engine's operation, as well as damage engine components. *See* TSD 213 n.222 (JA675 n.222). Furthermore, if the intake valve were to close too late (in an effort to conserve fuel), there would be insufficient pressure in the combustion chamber when the spark plug fires. This lack of compression leads to what is called a "misfire," where no combustion or only partial combustion occurs. *See* Alex Steele, *Shop Class: How to Diagnose an Engine Misfire*, MotorTrend (May 18, 2018), https://www.motortrend.com/features/1805-shop-class-how-to-diagnose-an-engine-misfire. Misfires can result in the engine not creating enough power and stalling, or the air-fuel mixture may not completely

combust, which can result in poor fuel-economy and the harmful emission of incompletely burned fuels.

d. An engine's compression ratio determines how much fuel efficiency can be achieved through use of the Atkinson cycle. The compression ratio is the ratio between the volume of the combustion chamber and cylinder when the piston is at the bottom of its stroke and the volume of the combustion chamber and cylinder when the piston is at the top of its stroke. 87 Fed. Reg. at 25,786 n.215 (JA949 n.215). When comparing two cylinders with the same maximum volume, the cylinder with the higher compression ratio will compress the air-fuel mixture into a smaller volume at the top of the piston's stroke.

An engine with a high compression ratio (for example, around 14:1) has a relatively small combustion chamber at the time of ignition. As a result, the engine can take full advantage of the Atkinson cycle: The intake valve can close later during the compression stroke (resulting in better fuel economy) while retaining sufficient pressure in the chamber when the spark plug ignites to avoid a misfire. But such an engine cannot achieve great power density because if the intake valve closes too early, leaving more air-fuel mixture in the chamber, the

mixture may over-compress and cause engine knock. Thus, engines with high compression ratios generally cannot use the traditional Otto cycle. *See* 87 Fed. Reg. at 25,790 (JA953) (a high compression ratio engine "is not able to completely achieve a traditional Otto cycle due to knock limitations").

An engine with a standard compression ratio (for example, 10:1), in contrast, has a relatively larger combustion chamber at the time of ignition. This means that the engine can burn more fuel in each cycle without causing engine knock, resulting in greater power density. But the engine cannot achieve the full fuel-economy benefits of the Atkinson cycle because if the intake valve closes too late, there will be insufficient pressure in the combustion chamber when the spark plug ignites, resulting in a misfire.

In sum, an engine's computer control unit can, within limits, use variable valve timing to modulate between the relatively greater fuel efficiency of the Atkinson cycle and the relatively greater power density of the Otto cycle. *See* TSD 189 (JA651). But the engine's capacity to do so is limited by the physical geometry of the engine: An engine with a standard compression ratio will be able to achieve greater power but

have less capacity for fuel savings. An engine with a high compression ratio will achieve greater fuel savings but have less capacity to produce high amounts of power.

Although most vehicles utilize variable valve timing, and thus can achieve some level of Atkinson cycle-like behavior, an engine is generally considered a high compression ratio engine if it possesses a geometric compression ratio "in the range of 13 – 14:1." EPA, *Draft Technical Assessment Report* 5-9 (July 2016) (JA193).

2. In the final rule, NHTSA considered three types of high compression ratio engines. TSD 189 (JA651). To determine the fuel-efficiency gains of such engines, NHTSA used modeling data from engines with compression ratios of approximately 13:1 and 14:1. *See* TSD 189-190 (JA651-652) (HCR0 technology was modeled using an engine with a "CR" (compression ratio) of "14":1; HCR1 and HCR1D technologies were modeled using engines with "CR" of "13.1":1).

NHTSA explained that high compression ratio engines cannot feasibly be employed in vehicles with high power demands because of the technology's inherent power-density limitations. For example, the agency determined that these engines cannot produce sufficient power

for "larger vehicles," such as pickup trucks, that are "capable of carrying more cargo … and towing larger and heavier trailers." TSD 216 (JA678). Accordingly, the agency restricted the CAFE Model from simulating the application of high compression ratio engines to three categories of vehicles: (1) vehicles with 405 or more horsepower, (2) pickup trucks, and (3) vehicles produced by "manufacturers that are heavily performance-focused and have demonstrated a significant commitment to power dense technologies," specifically, BMW, Daimler, and Jaguar Land Rover. 87 Fed. Reg. at 25,789-25,790, 25,790 n.234 (JA952-953, 953 n.234). NHTSA also restricted the CAFE Model from applying high compression ratio engines to vehicles that share engines with vehicles in those three categories. *See id.* at 25,789 (JA952). This was done to ensure that the CAFE Model did not project the application of high compression ratio technologies in a manner that was unlikely to occur in the real world.

SUMMARY OF ARGUMENT

NHTSA reasonably determined that high compression ratio engines cannot feasibly be implemented in vehicles that require high power density, such as pickup trucks. The agency explained that high

compression ratio engines achieve greater fuel efficiency by using an Atkinson-cycle operation, and they do so at the expense of power density. The engine's computer control unit has some ability to balance the tradeoff between fuel efficiency and power density by dynamically adjusting how long the fuel intake valve remains open, and thus the amount of fuel combusted in each engine cycle. But NHTSA determined that a high compression ratio engine must maintain some minimum amount of Atkinson-cycle behavior to avoid engine knock, and therefore cannot achieve the power density that pickup trucks need to haul or tow greater loads.

NHTSA also reasonably decided not to model the application of high compression ratio engines in vehicles that share an engine with a vehicle in which a high compression ratio engine could not be feasibly implemented (such as a pickup truck). Manufacturers share parts, including engines, across vehicle models to take advantage of important economic benefits, such as economies of scale. It would be impracticable to expect manufacturers to abandon parts sharing in order to put a high compression ratio engine in a vehicle that currently shares an engine with a pickup truck.

NRDC's objections are misplaced. First, NRDC errs in asserting that certain pickup trucks, such as the Toyota Tacoma, already use high compression ratio engines. The compression ratios of the engines used in those pickups are far lower than what NHTSA considered to be a "high" compression ratio.

Second, NHTSA adequately explained and supported its conclusion that high compression ratio engines are unable to supply the power or torque needed by pickups under heavier load conditions. NRDC may disagree with that engineering judgment, but this Court should give a high level of deference to NHTSA's resolution of a technical question within the agency's area of expertise.

Third, petitioner contends that NHTSA's reliance on parts sharing is a post hoc justification for the agency's decision not to model the application of high compression ratio engines in vehicles that share an engine with pickup trucks. But the rule explains NHTSA's decision to model parts sharing, and any explanation discernable by petitioner on the face of the rule cannot reasonably be characterized as a post hoc rationalization by the government's appellate counsel.

Fourth, NRDC errs in arguing that NHTSA erroneously blocked the CAFE Model from applying high compression ratio engines to more vehicles than NHTSA intended. As an initial matter, this argument is forfeited because it was not raised during the administrative stage of the rulemaking process. In any event, the modeling decisions that NRDC argues were erroneous are in fact explained by NHTSA's treatment of parts sharing.

If this Court were to find any error in NHTSA's treatment of high compression ratio engines, however, the Court should remand the rule to NHTSA without vacatur, as petitioner requests.

ARGUMENT

I. THE MANNER IN WHICH NHTSA MODELED THE APPLICATION OF HIGH COMPRESSION RATIO TECHNOLOGY WAS NOT ARBITRARY OR CAPRICIOUS

A. NHTSA Reasonably Modeled How Automakers Could Use High Compression Ratio Engines To Comply With More Stringent Fuel-Economy Standards

1. NHTSA began its analysis by identifying the engine technologies present on model year 2020 vehicles. In the market data file, NHTSA assigned each engine a unique code, identified the engine used by each vehicle model and configuration, and described the

technology used on each engine. 87 Fed. Reg. at 25,787 (JA950); TSD 91 (JA553). For example, the market data file shows that Toyota produced 33 different configurations of the Tacoma pickup truck.[17] Each configuration of the Tacoma used one of two engines—engine code 232701 or 233501.[18] One of those engines (232701) has a compression ratio of 10.2:1 and the other (233501) has a compression ratio of 11.8:1.[19] Based on these compression ratios, NHTSA recognized that the Tacoma does not utilize high compression ratio technology that is able to derive the full benefits from an Atkinson cycle. *See Draft Technical Assessment Report*, *supra*, at 5-9 (JA193) (explaining that "Atkinson Cycle Engines" feature "a substantial increase in geometric compression ratio (in the range of 13 – 14:1)").[20]

2. After compiling the model year 2020 fleet data, NHTSA used the CAFE Model to simulate how manufacturers could apply technology

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[17] *See Market Data File*, *supra*, vehicles tab, rows 1315-1347, col. E.

[18] *See Market Data File*, *supra*, vehicles tab, rows 1315-1347, col. H.

[19] *See Market Data File*, *supra*, engines tab, rows 101 & 122, col. Q.

[20] *See Market Data File*, *supra*, engines tab, rows 101 & 122, cols. AD-AF ("HCR0," "HCR1," and "HCR1D" technologies are not "USED").

upgrades to their fleets to comply with more stringent fuel-economy standards. In doing so, however, NHTSA imposed certain constraints on the CAFE Model's simulation of how automakers could use additional technology. NHTSA used these "adoption features" to improve the realism of the model. 87 Fed. Reg. at 25,789-25,791 (JA952-954). For example, the CAFE Model would only simulate manufacturers applying certain major technology upgrades to vehicle models during years in which the manufacturer had planned a "redesign" for those vehicles. *See id.* at 25,789 (JA952). Other adoption features recognized that certain technologies are mutually exclusive or cannot feasibly be applied to certain types of vehicles. *See id.*

As relevant here, NHTSA constrained the CAFE Model from simulating automakers using high compression ratio engines in pickup trucks, vehicles with 405 or more horsepower, and vehicles produced by manufacturers "that are heavily performance-focused and have demonstrated a significant commitment to power dense technologies." 87 Fed. Reg. at 25,789-25,790 (JA952-953). NHTSA explained that these vehicles have a "prescribed duty cycle" that requires "large torque reserves." *Id.* at 25,789 (JA952). In other words, these vehicles are

marketed and sold as having capabilities such as hauling and towing (their "prescribed duty cycle") that require an engine that can provide high power density, in the form of torque, upon demand ("large torque reserves"). NHTSA explained that the power requirements of these vehicles are "not supported by the lower power density found in [high compression ratio]-based engines." *Id.*

Furthermore, even when they are not hauling or towing, pickup trucks are more likely to have a higher baseline road load due to greater drag resulting from "a larger front profile," "greater tire rolling resistance resulting from larger tires with a more aggressive tread," and the greater demand of four-wheel drive. 87 Fed. Reg. at 25,790 (JA953) (quotation marks omitted). Thus, even when operating at relatively low loads, NHTSA concluded that pickup trucks demand power density that cannot be supplied efficiently (if at all) by high compression ratio engines. *See id.* at 25,786 (JA949) ("Vehicles … that have high base road loads[] will see little to no benefit from this technology compared with other advanced engine technologies.").

NHTSA recognized that some commentors had urged the agency not to constrain the CAFE Model's application of high compression ratio

engines. 87 Fed. Reg. at 25,790 (JA953). In particular, the International Council on Clean Transportation commented that pickup trucks "spend the vast majority of driving at low loads relative to the engine's capability" and could take advantage of the greater efficiency of Atkinson-cycle operation at those times, while meeting the need "for 'additional torque reserves' by switching to Otto Cycle." *Id.* (quotation marks omitted).

NHTSA disagreed with these commenters' understanding of the technology. NHTSA explained that high compression ratio engines achieve Atkinson-cycle operation "using continuous variable valve timing." 87 Fed. Reg. at 25,790 (JA953). At lower loads, the engine will close the intake valve later, decreasing the amount of fuel combusted in each engine cycle. *Id.* This has the effect of "reducing torque while increasing efficiency." *Id.* When the vehicle is operating at higher loads, the intake valve will close sooner in the combustion cycle, resulting in the combustion of more fuel, "decreasing thermal efficiency, and increasing torque." *Id.* While the engine is thereby able to generate relatively more torque, however, "the engine is not able to completely achieve a traditional Otto cycle due to knock limitations and

maintains a minimum of over-expansion behavior" (*i.e.*, Atkinson-cycle behavior). *Id.* As explained above, if the intake valve closes too early, leaving too much air-fuel mixture in the combustion chamber, the mixture can over-compress and cause harmful engine knock. *See supra* p. 90. Thus, variable valve timing "improves the engine efficiency but does not give the engine the functional flexibility suggested by [the International Council on Clean Transportation's] interpretation of the technology description." 87 Fed. Reg. at 25,790 (JA953).

NHTSA explained that comments from automakers in earlier rulemakings addressing the capabilities of high compression ratio engines supported the agency's conclusion that these engines cannot feasibly be implemented in vehicles that demand high power density, whether they require that power at all times or only when operating at high loads. In particular, Toyota, Ford, and the Alliance for Automotive Innovation had submitted comments that indicated, collectively, that NHTSA's "restrained application" of high compression ratio engines appropriately reflects the "[i]nherent performance limitations" "that will limit penetration of this technology." 87 Fed. Reg. at 25,790-25,791 (JA953-954).

NHTSA thus “examined the material factors, considered the record as a whole, and provided a reasonable explanation for its decision” that, based on the current state of engine technologies, high compression ratio engines are not reasonable candidates for vehicles with high power demands. *Pharmaceutical Mfg. Research Servs., Inc. v. FDA*, 957 F.3d 254, 265 (D.C. Cir. 2020). That determination is “precisely the type of technical, scientific judgment this court will not second-guess.” *Troy Corp. v. Browner*, 120 F.3d 277, 289 (D.C. Cir. 1997).

3. NHTSA also reasonably constrained the CAFE Model to account for “parts sharing” across vehicle models. 87 Fed. Reg. at 25,760 (JA923). Manufacturers use common engines, transmissions, and mass-reduction platforms across multiple vehicle models to “achieve economies of scale, deploy capital efficiently, and make the most of shared research and development expenses, while still presenting a wide array of consumer choices to the market.” *Id.* The CAFE Model accounted for parts sharing by simulating vehicles that share a part as adopting fuel-saving technologies affecting that part together. *See* TSD 111 (JA573). Thus, if the CAFE Model were to

simulate an automaker upgrading a vehicle's engine to a high compression ratio engine, it would also simulate the same technology upgrade being applied in subsequent years to all other vehicle models that use the same engine. The inverse is also true: If an upgrade could not reasonably be applied to a particular vehicle, the CAFE Model would maintain parts sharing by not applying that upgrade to any other vehicle sharing the same engine.

NHTSA therefore constrained the CAFE Model from simulating the application of a high compression ratio engine to any vehicle that shared an engine with a pickup truck, a vehicle with 405 or more horsepower, or a vehicle produced by a manufacturer that had demonstrated a significant commitment to power-dense technologies. *See* 87 Fed. Reg. at 25,789 (JA952) ("[V]ehicles that share engines with pickup trucks are currently excluded from receiving [high compression ratio] engines[.]"). By implementing this constraint, NHTSA avoided the unrealistic assumption that manufacturers would abandon the parts-sharing approach and invest substantial sums of money to produce additional engine models. *See* Nat'l Acad. of Scis., *Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-*

Duty Vehicles 256 (2015) (JA163) (estimating that it costs $750 million to $1.5 billion to develop a new engine). NHTSA's modeling of parts sharing was thus reasonable. *See West Virginia v. EPA*, 362 F.3d 861, 868 (D.C. Cir. 2004) (an agency "has undoubted power to use predictive models as long as it explains the assumptions and methodology used" (alterations and quotation marks omitted)).

B. NRDC Errs In Arguing That NHTSA's Consideration Of High Compression Ratio Engines Was Arbitrary And Capricious

NRDC offers a variety of contentions to support its claim that NHTSA's modeling of the application of high compression ratio engines was arbitrary and capricious. None of them has merit.

1. Petitioner first contends (*e.g.*, NRDC Br. 19, 29, 42) that it was unreasonable for NHTSA to conclude that pickup trucks cannot use high compression ratio engines because (according to NRDC) the Toyota Tacoma and Dodge Ram 1500 pickups already use such engines. That is incorrect.

The engines on the Tacoma and Ram feature compression ratios that are substantially lower than those on the high compression ratio engines that NHTSA used to model the capabilities of that technology,

and substantially lower than those of engines generally regarded as having high compression ratios. The Tacoma uses engines with compression ratios of 11.8:1 and 10.2:1. *See supra* p. 98.[21] And the three gasoline engines used on the Ram have compression ratios of 10.2:1, 10.5:1, and 11.3:1.[22] The high compression ratio engines that NHTSA modeled to determine the technology's power and fuel-efficiency characteristics, in contrast, had compression ratios of 13.1:1 and 14:1. *See supra* p. 93; *cf. Draft Technical Assessment Report*, *supra*, at 5-9 (JA193) (Atkinson cycle engines feature "a substantial increase in geometric compression ratio (in the range of 13 – 14:1)").

As explained above, these differences matter: Engines with lower compression ratios cannot achieve the same degree of efficiency benefits from an Atkinson cycle as those with higher compression ratios. Thus, while the Tacoma and Ram can achieve some limited amount of Atkinson cycle-like behavior through variable valve timing, they do not have high compression ratio engines as NHTSA characterizes that

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[21] *See also Market Data File*, *supra*, engines tab, rows 101 & 122, col. Q.

[22] *See Market Data File*, *supra*, engines tab, rows 261-262 & 272, col. Q.

technology in the final rule and cannot realize the full benefits of Atkinson cycle operation.

To be sure, NHTSA and other government agencies have sometimes stated that the Tacoma uses an "Atkinson Cycle engine." *See, e.g.*, *Draft Technical Assessment Report*, *supra*, at 5-32 (JA216). And NRDC correctly notes that Toyota has "marketed" the Tacoma as using an "Atkinson-cycle engine." NRDC Br. 42 & n.13. Such references recognize that the Tacoma can achieve Atkinson cycle-like behavior through variable valve timing (among other technology) that enables a relatively longer expansion stroke than compression stroke and some fuel-economy benefit. The final rule accounts for the benefit of those technology upgrades on the Tacoma, and the CAFE Model is permitted to apply those upgrades to other pickups, as well.[23] But the Tacoma does not use a high compression ratio engine as modeled by NHTSA.[24]

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[23] *See Market Data File*, *supra*, engines tab, row 101, cols. V & X (variable valve timing (VVT) and stoichiometric gasoline direct injection (SGDI) are "USED").

[24] Given the broader usage of the terms elsewhere, the final rule uses the terms "Atkinson engine" and "high compression ratio engine" interchangeably. Nevertheless, the rule makes clear that high

Continued on next page.

2. Petitioner also errs in arguing that NHTSA failed to explain and support its decision not to model the application of high compression ratio engines to pickup trucks. NRDC contends (NRDC Br. 31-33) that NHTSA failed to account for how pickup trucks are most commonly used and the fact that many pickups are used primarily under relatively lower-load conditions. But the fact that some pickups may rarely be used for towing is beside the point.

First, given that the pickup trucks identified by petitioner do not use high compression ratio engines, petitioner offers no examples of high compression ratio engines employed in this type of vehicle. NHTSA can hardly be faulted for limiting the high compression ratio engine technology to those areas in which it has been successfully deployed.

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compression ratio engines are a category of engines that most effectively use the Atkinson cycle to improve their fuel efficiency, and not every engine that uses some minimal amount of Atkinson cycle-like behavior has a high enough compression ratio to qualify as a high compression ratio engine. As this intent from the rule "may reasonably be discerned," any confusion arising from the rule's use of these terms would not constitute reversible error. *Alaska Dep't of Envtl. Conservation v. EPA*, 540 U.S. 461, 497 (2004).

Second, pickup trucks have a larger baseline road load, and thus need more power-dense engines than passenger vehicles even when they are not hauling or towing. *See supra* p. 100; 87 Fed. Reg. at 25,790 (JA953).

Third, pickup truck engines must have the capacity to increase torque when operating under higher load conditions such as hauling or towing, even if those conditions occur infrequently. As NHTSA explained in the final rule, pickup trucks "must maintain a high level of torque reserve"—that is, they must be ready to supply the increased torque when needed. 87 Fed. Reg. at 25,786 (JA949). NHTSA explained that a pickup truck with a high compression ratio engine would be unable to meet the high-load demands of hauling or towing when needed—even if it could meet the higher baseline road load demands of the pickup—because high compression ratio engines cannot easily accommodate demands to generate more torque. Such an engine "is not able to completely achieve a traditional Otto cycle due to knock limitations and maintains a minimum of over-expansion behavior." *Id.* at 25,790 (JA953). Thus, high compression ratio engines are incompatible with pickup trucks' prescribed duty cycle—*i.e.*, the

maximum demand and capability for which such vehicles are marketed and used. NHTSA therefore did not need to examine or address how often pickups are used to tow or haul because it was entirely reasonable to conclude that the relevant factor for purposes of this rulemaking was the engines' maximum capability.

For the same reason, NHTSA acted reasonably in explaining that pickup trucks need large "torque reserves." 87 Fed. Reg. at 25,789 (JA952). NRDC criticizes (NRDC Br. 33-34) NHTSA's use of that term, but the agency used that phrase in the final rule (but not the proposed rule) because it was responding to the International Council on Clean Transportation's use of that phrase in a comment. *See* 87 Fed. Reg. at 25,790 (JA953). In any event, the meaning of the phrase is clear: It refers to a vehicle's capacity to apply high levels of torque upon demand to meet the capabilities for which it is marketed and sold. *See Reserve*, Merriam-Webster Dictionary, https://perma.cc/C9MK-F5VK ("something stored or kept available for future use or need"). As NHTSA explained, vehicles with the capacity to haul large loads or tow must maintain the ability to generate more power by entering into the

less efficient Otto cycle, and high compression ratio engines are incapable of such operation. *See* 87 Fed. Reg. at 25,790 (JA953).

NRDC also errs in suggesting (NRDC Br. 36-37) that pickup truck engines' computer control units can be calibrated in a manner that would allow a high compression ratio engine to move fluidly along a full spectrum between Otto cycle-like behavior and Atkinson cycle-like behavior, providing high torque and power density when needed and providing fuel efficiency when less power is needed. The power-density limitations of high compression ratio engines stem from those engines' hardware, not their software, however, and no amount of computer calibration can fully resolve those limitations. As NHTSA explained, the computer control unit of an engine can use variable valve timing to achieve relatively more power density when a vehicle is operating under high-load conditions and relatively more efficiency when the vehicle is operating under lower-load conditions. 87 Fed. Reg. at 25,790 (JA953). But due to its physical geometry, a high compression ratio engine cannot combust as much gasoline (and thus create as much power) as a traditional engine because of "knock limitations." *Id.* A high compression ratio engine must "maintain[] a minimum of over-

expansion behavior"—*i.e.*, delayed intake valve closing—even under high-load conditions. *Id.*; *see supra* pp. 101-102.

Contrary to petitioner's suggestion (NRDC Br. 8), the power-density limitations of high compression ratio engines have not been overcome. NRDC cites a 2015 report from the National Academy of Sciences that explained that Toyota had used Atkinson cycle engines with a high compression ratio "in its hybrid vehicles since 1997." Nat'l Acad. of Scis., *supra*, at 70 (JA156). (In hybrid vehicles, the electric motor can make up for the high compression ratio engine's lack of power density. *See* TSD 190 (JA652).) The report stated that Toyota had recently developed engine technology that "is expected to facilitate the application of Atkinson cycle engines in conventional vehicles." Nat'l Acad. of Scis., *supra*, at 70-71 (JA156-157). The report thus acknowledged Toyota's announcement that the "issue with low torque" had been "overcome" such that high compression ratio engines could be used in some non-hybrid vehicles. *Id.* But neither the National Academy of Sciences report nor Toyota suggested that these developments would allow the application of high compression ratio

engines in all circumstances or all vehicles, and the report did not address the feasibility of using such engines in pickup trucks.

NRDC may disagree with NHTSA's engineering judgment regarding the feasibility of implementing high compression ratio engines in pickup trucks, but NHTSA's conclusion is adequately explained and supported by the record. The Court must "give a high level of deference to [NHTSA's] evaluations of scientific data within its area of expertise," *Center for Biological Diversity v. EPA*, 749 F.3d 1079, 1088 (D.C. Cir. 2014) (quoting *A.L. Pharma, Inc. v. Shalala*, 62 F.3d 1484, 1490 (D.C. Cir. 1995)), and may not second-guess the scientific judgments of the agency, *Troy Corp.*, 120 F.3d at 289.[25]

3. NRDC next argues that NHTSA acted arbitrarily in constraining the CAFE Model from applying high compression ratio engines to vehicles that share an engine with pickup trucks. As explained above, however, NHTSA recognized that manufacturers use

[25] NRDC argues (NRDC Br. 37-40) that NHTSA erred in relying on a confidential conversation in support of its decision. But the referenced conversation with automakers, *see* 87 Fed. Reg. at 25,789 n.233 (JA952 n.233), only confirmed the conclusions that NHTSA drew based on publicly available and disclosed information, including automakers' comments in this and prior rulemakings.

common parts (including engines) across vehicles for important reasons, and it reasonably decided to reflect parts sharing in its model. *See supra* pp. 103-105; 87 Fed. Reg. at 25,760 (JA923). Thus, once NHTSA decided not to model the implementation of high compression ratio engines on pickups, it also constrained the CAFE Model from simulating application of that technology on other vehicles that share an engine with pickups.

NRDC errs in contending (NRDC Br. 43-44) that this is a "post hoc" justification for NHTSA's approach. NHTSA explained its approach to parts sharing in the final rule and the Technical Support Document. *See* 87 Fed. Reg. at 25,760 (JA923); TSD 111-112 (JA573-574). It is of no matter that NHTSA explained its approach to parts sharing (which was a generally applicable consideration in applying new technology) in a different part of the rule than its specific discussion of high compression ratio engines.

"Even when an agency explains its decision with 'less than ideal clarity,' a reviewing court will not upset the decision on that account 'if the agency's path may reasonably be discerned.'" *Alaska Dep't of Envtl. Conservation v. EPA*, 540 U.S. 461, 497 (2004). There can be no

question that NHTSA's reasoning is reasonably discerned here since NRDC identified that reasoning for itself in its opening brief. A rationale that is apparent to petitioner can hardly be characterized as the government's "appellate counsel's *post hoc* rationalization[] for agency action." *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 50 (1983).

NRDC's discussion (NRDC Br. 44-45) of "leader" and "follower" vehicles is likewise unavailing. Where a particular engine upgrade can be applied to all vehicles sharing an engine, the CAFE Model will simulate application of the upgrade first to the vehicle that is the sales "leader" in that vehicle's refresh or redesign year, and then to any follower vehicles in their subsequent refresh or redesign years. *See* CAFE Model Documentation 33 (JA838). Manufacturers are likely to adopt such an approach to recoup the cost of technology upgrades more quickly. But the leader-follower rule has no application when a technology upgrade cannot be applied to all vehicles sharing a particular engine. If a pickup truck and a sport utility vehicle share an engine, the only way they can continue to share the engine—and that the manufacturer can continue to save costs by using the same engine

in multiple vehicles—is if neither vehicle is upgraded to a high compression ratio engine. In such a case, it simply does not matter whether the pickup truck or the sport utility vehicle is the sales leader.

4. NRDC also errs in arguing (NRDC Br. 46-48) that NHTSA blocked the CAFE Model from applying high compression ratio engines to more vehicles than it intended.

As an initial matter, NRDC forfeited these arguments because neither NRDC "nor any other party before the agency raised … these contentions during the administrative phase of the rulemaking process." *National Wildlife Fed'n v. EPA*, 286 F.3d 554, 562 (D.C. Cir. 2002). NRDC's comment argued that the CAFE Model should not restrict the application of high compression ratio engines to pickup trucks and other vehicles with high power-density needs, and it pointed out that NHTSA had made a coding error that improperly blocked the modeling of "HCR1D" technology (an error that NHTSA corrected in the final rule, *see* 87 Fed. Reg. at 25,791 (JA954)). *See* Comment from Ctr. for Biological Diversity et al., App. at 46-47, Doc. No. NHTSA-2021-0053-1572 (Oct. 26, 2021), https://www.regulations.gov/comment/NHTSA-2021-0053-1572 (JA405-406). But commenters did not identify

the particular errors that NRDC now alleges. Accordingly, NHTSA did not have an opportunity to address the issues.

In any event, NRDC's assertions of error are meritless. First, NHTSA did not erroneously block 440,000 General Motors vehicles from adopting high compression ratio engines. *Contra* NRDC Br. 47. NHTSA correctly instructed the CAFE Model not to apply high compression ratio engines to the vehicles in question (those vehicles with engine codes 113601 and 113602, including the GMC Acadia and Chevrolet Traverse) because they used a variant of the same engine used by the Chevrolet Colorado and GMC Canyon (engine code 113603), which are pickup trucks. *See* 83 Fed. Reg. 42,986, 43,175 (Aug. 24, 2018) (noting that the Colorado and Canyon share an engine with, *inter alia*, the GMC Acadia and Chevrolet Traverse). Although NHTSA used different engine codes to identify three variants of this engine, it concluded that General Motors would not change one of those engines without changing the others.

Second, NHTSA correctly instructed the CAFE Model not to simulate the application of high compression ratio technology to vehicles that shared an engine with a vehicle with 405 or more

horsepower. As explained above, the agency reasonably determined that vehicles with 405 or more horsepower cannot use high compression ratio engines. *See supra* pp. 99-100; 87 Fed. Reg. at 25,789 (JA952).[26] To reflect manufacturers' parts-sharing decisions, therefore, the CAFE Model also did not simulate the introduction of high compression ratio engines to vehicles that shared an engine with a vehicle with 405 or more horsepower.

Although NHTSA did not expressly identify this constraint on the CAFE Model, it logically follows from the combination of the final rule's approach to parts sharing and the determination that high compression ratio engines cannot be used in vehicles with 405 or more horsepower. Indeed, a different approach would have modeled manufacturers needing to develop and produce separate engines for those vehicles, which would conflict with NHTSA's approach to parts sharing. Because NHTSA's "path may reasonably be discerned," *Alaska Dep't of Envtl. Conservation*, 540 U.S. at 497 (quotation marks omitted), its decision should be affirmed.

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[26] NRDC does not contend that it was unreasonable for NHTSA to constrain the CAFE Model from applying high compression ratio engines to vehicles with 405 or more horsepower.

II. EVEN IF NHTSA ERRED, THE APPROPRIATE REMEDY WOULD BE REMAND WITHOUT VACATUR

NRDC properly asks for remand without vacatur in the event the Court concludes that NHTSA erred in its consideration of high compression ratio engines. Even if NHTSA's explanation of its decision was lacking, the agency "may be able readily to cure [that] defect" on remand. *Heartland Reg'l Med. Ctr.*, 566 F.3d at 198. Furthermore, as explained above, vacating the regulations would undermine the energy-conservation goals of EPCA and risk significant harm to the public health and the environment. *See supra* pp. 80-83. Moreover, vacating the standards "would at least temporarily defeat [NRDC's] purpose," the enhanced protection of the environment. *Environmental Def. Fund, Inc. v. EPA*, 898 F.2d 183, 190 (D.C. Cir. 1990). In such circumstances, the "general rule" is remand without vacatur. *Wisconsin*, 938 F.3d at 336.

CONCLUSION

For the foregoing reasons, the petitions for review should be denied.

Respectfully submitted,

BRIAN M. BOYNTON
Principal Deputy Assistant Attorney General

MARK B. STERN

/s/ Joshua M. Koppel
JOSHUA M. KOPPEL
KEVIN J. KENNEDY
Attorneys, Appellate Staff
Civil Division, Room 7212
U.S. Department of Justice
950 Pennsylvania Avenue NW
Washington, DC 20530
(202) 514-4820
joshua.m.koppel@usdoj.gov

Of Counsel:

JOHN E. PUTNAM
General Counsel

PAUL M. GEIER
Assistant General Counsel

JOHN DONALDSON
Acting Chief Counsel

HUNTER OLIVER
Attorney, National Highway Traffic Safety Administration

Department of Transportation

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CERTIFICATE OF COMPLIANCE

This brief complies with the type-volume limit of the Court's September 22, 2022 order because it contains 22,247 words. This brief also complies with the typeface and type-style requirements of Federal Rule of Appellate Procedure 32(a)(5)-(6) because it was prepared using Word for Microsoft 365 in Century Schoolbook 14-point font, a proportionally spaced typeface.

/s/ Joshua M. Koppel
Joshua M. Koppel

ADDENDUM

TABLE OF CONTENTS

49 U.S.C. § 32901

§ 32901. Definitions

(a) General. In this chapter--

(1) "alternative fuel" means--

(A) methanol;

(B) denatured ethanol;

(C) other alcohols;

(D) except as provided in subsection (b) of this section, a mixture containing at least 85 percent of methanol, denatured ethanol, and other alcohols by volume with gasoline or other fuels;

(E) natural gas;

(F) liquefied petroleum gas;

(G) hydrogen;

(H) coal derived liquid fuels;

(I) fuels (except alcohol) derived from biological materials;

(J) electricity (including electricity from solar energy); and

(K) any other fuel the Secretary of Transportation prescribes by regulation that is not substantially petroleum and that would yield substantial energy security and environmental benefits.

(2) "alternative fueled automobile" means an automobile that is a--

(A) dedicated automobile; or

(B) dual fueled automobile.

* * *

(5) "average fuel economy" means average fuel economy determined under section 32904 of this title.

(6) "average fuel economy standard" means a performance standard specifying a minimum level of average fuel economy applicable to a manufacturer in a model year.

* * *

(8) “dedicated automobile” means an automobile that operates only on alternative fuel.

(9) “dual fueled automobile” means an automobile that--

(A) is capable of operating on alternative fuel or a mixture of biodiesel and diesel fuel meeting the standard established by the American Society for Testing and Materials or under section 211(u) of the Clean Air Act (42 U.S.C. 7545(u)) for fuel containing 20 percent biodiesel (commonly known as “B20”) and on gasoline or diesel fuel;

(B) provides equal or superior energy efficiency, as calculated for the applicable model year during fuel economy testing for the United States Government, when operating on alternative fuel as when operating on gasoline or diesel fuel;

(C) for model years 1993-1995 for an automobile capable of operating on a mixture of an alternative fuel and gasoline or diesel fuel and if the Administrator of the Environmental Protection Agency decides to extend the application of this subclause, for an additional period ending not later than the end of the last model year to which section 32905(b) and (d) of this title applies, provides equal or superior energy efficiency, as calculated for the applicable model year during fuel economy testing for the Government, when operating on a mixture of alternative fuel and gasoline or diesel fuel containing exactly 50 percent gasoline or diesel fuel as when operating on gasoline or diesel fuel; and

(D) for a passenger automobile, meets or exceeds the minimum driving range prescribed under subsection (c) of this section.

* * *

(11) “fuel economy” means the average number of miles traveled by an automobile for each gallon of gasoline (or equivalent amount of other fuel) used, as determined by the Administrator under section 32904(c) of this title.

* * *

49 U.S.C. § 32902

§ 32902. Average fuel economy standards

(a) Prescription of standards by regulation.--At least 18 months before the beginning of each model year, the Secretary of Transportation shall prescribe by regulation average fuel economy standards for automobiles manufactured by a manufacturer in that model year. Each standard shall be the maximum feasible average fuel economy level that the Secretary decides the manufacturers can achieve in that model year.

(b) Standards for automobiles and certain other vehicles.--

(1) In general.--The Secretary of Transportation, after consultation with the Secretary of Energy and the Administrator of the Environmental Protection Agency, shall prescribe separate average fuel economy standards for--

(A) passenger automobiles manufactured by manufacturers in each model year beginning with model year 2011 in accordance with this subsection;

(B) non-passenger automobiles manufactured by manufacturers in each model year beginning with model year 2011 in accordance with this subsection; and

(C) work trucks and commercial medium-duty or heavy-duty on-highway vehicles in accordance with subsection (k).

(2) Fuel economy standards for automobiles.--

(A) Automobile fuel economy average for model years 2011 through 2020.--The Secretary shall prescribe a separate average fuel economy standard for passenger automobiles and a separate average fuel economy standard for non-passenger automobiles for each model year beginning with model year 2011 to achieve a combined fuel economy average for model year 2020 of at least 35 miles per gallon for the total fleet of passenger and non-passenger automobiles manufactured for sale in the United States for that model year.

(B) Automobile fuel economy average for model years 2021 through 2030.--For model years 2021 through 2030, the average fuel economy required to be attained by each fleet of passenger and non-

passenger automobiles manufactured for sale in the United States shall be the maximum feasible average fuel economy standard for each fleet for that model year.

(C) Progress toward standard required.--In prescribing average fuel economy standards under subparagraph (A), the Secretary shall prescribe annual fuel economy standard increases that increase the applicable average fuel economy standard ratably beginning with model year 2011 and ending with model year 2020.

(3) Authority of the Secretary.--The Secretary shall--

(A) prescribe by regulation separate average fuel economy standards for passenger and non-passenger automobiles based on 1 or more vehicle attributes related to fuel economy and express each standard in the form of a mathematical function; and

(B) issue regulations under this title prescribing average fuel economy standards for at least 1, but not more than 5, model years.

(4) Minimum standard.--In addition to any standard prescribed pursuant to paragraph (3), each manufacturer shall also meet the minimum standard for domestically manufactured passenger automobiles, which shall be the greater of--

(A) 27.5 miles per gallon; or

(B) 92 percent of the average fuel economy projected by the Secretary for the combined domestic and non-domestic passenger automobile fleets manufactured for sale in the United States by all manufacturers in the model year, which projection shall be published in the Federal Register when the standard for that model year is promulgated in accordance with this section.

(c) Amending passenger automobile standards.--The Secretary of Transportation may prescribe regulations amending the standard under subsection (b) of this section for a model year to a level that the Secretary decides is the maximum feasible average fuel economy level for that model year. Section 553 of title 5 applies to a proceeding to amend the standard. However, any interested person may make an oral presentation and a transcript shall be taken of that presentation.

(d) Exemptions.—

(1) Except as provided in paragraph (3) of this subsection, on application of a manufacturer that manufactured (whether in the United States or not) fewer than 10,000 passenger automobiles in the model year 2 years before the model year for which the application is made, the Secretary of Transportation may exempt by regulation the manufacturer from a standard under subsection (b) or (c) of this section. An exemption for a model year applies only if the manufacturer manufactures (whether in the United States or not) fewer than 10,000 passenger automobiles in the model year. The Secretary may exempt a manufacturer only if the Secretary--

(A) finds that the applicable standard under those subsections is more stringent than the maximum feasible average fuel economy level that the manufacturer can achieve; and

(B) prescribes by regulation an alternative average fuel economy standard for the passenger automobiles manufactured by the exempted manufacturer that the Secretary decides is the maximum feasible average fuel economy level for the manufacturers to which the alternative standard applies.

(2) An alternative average fuel economy standard the Secretary of Transportation prescribes under paragraph (1)(B) of this subsection may apply to an individually exempted manufacturer, to all automobiles to which this subsection applies, or to classes of passenger automobiles, as defined under regulations of the Secretary, manufactured by exempted manufacturers.

(3) Notwithstanding paragraph (1) of this subsection, an importer registered under section 30141(c) of this title may not be exempted as a manufacturer under paragraph (1) for a motor vehicle that the importer--

(A) imports; or

(B) brings into compliance with applicable motor vehicle safety standards prescribed under chapter 301 of this title for an individual under section 30142 of this title.

(4) The Secretary of Transportation may prescribe the contents of an application for an exemption.

* * *

(f) Considerations on decisions on maximum feasible average fuel economy.--When deciding maximum feasible average fuel economy under this section, the Secretary of Transportation shall consider technological feasibility, economic practicability, the effect of other motor vehicle standards of the Government on fuel economy, and the need of the United States to conserve energy.

(g) Requirements for other amendments.—

(1) The Secretary of Transportation may prescribe regulations amending an average fuel economy standard prescribed under subsection (a) or (d) of this section if the amended standard meets the requirements of subsection (a) or (d), as appropriate.

(2) When the Secretary of Transportation prescribes an amendment under this section that makes an average fuel economy standard more stringent, the Secretary shall prescribe the amendment (and submit the amendment to Congress when required under subsection (c)(2) of this section) at least 18 months before the beginning of the model year to which the amendment applies.

(h) Limitations.--In carrying out subsections (c), (f), and (g) of this section, the Secretary of Transportation--

(1) may not consider the fuel economy of dedicated automobiles;

(2) shall consider dual fueled automobiles to be operated only on gasoline or diesel fuel; and

(3) may not consider, when prescribing a fuel economy standard, the trading, transferring, or availability of credits under section 32903.

* * *

49 U.S.C. § 32903

§ 32903. Credits for exceeding average fuel economy standards

(a) Earning and period for applying credits.--When the average fuel economy of passenger automobiles manufactured by a manufacturer in a particular model year exceeds an applicable average fuel economy standard under subsections (a) through (d) of section 32902 (determined by the Secretary of Transportation without regard to credits under this section), the manufacturer earns credits. The credits may be applied to--

(1) any of the 3 consecutive model years immediately before the model year for which the credits are earned; and

(2) to the extent not used under paragraph (1)1 any of the 5 consecutive model years immediately after the model year for which the credits are earned.

* * *

49 U.S.C. § 32904

§ 32904. Calculation of average fuel economy

(a) Method of calculation.—

(1) The Administrator of the Environmental Protection Agency shall calculate the average fuel economy of a manufacturer subject to--

(A) section 32902(a) of this title in a way prescribed by the Administrator; and

(B) section 32902(b)-(d) of this title by dividing--

(i) the number of passenger automobiles manufactured by the manufacturer in a model year; by

(ii) the sum of the fractions obtained by dividing the number of passenger automobiles of each model manufactured by the manufacturer in that model year by the fuel economy measured for that model.

(2) (A) In this paragraph, "electric vehicle" means a vehicle powered primarily by an electric motor drawing electrical current from a portable source.

(B) If a manufacturer manufactures an electric vehicle, the Administrator shall include in the calculation of average fuel economy under paragraph (1) of this subsection equivalent petroleum based fuel economy values determined by the Secretary of Energy for various classes of electric vehicles. The Secretary shall review those values each year and determine and propose necessary revisions based on the following factors:

(i) the approximate electrical energy efficiency of the vehicle, considering the kind of vehicle and the mission and weight of the vehicle.

(ii) the national average electrical generation and transmission efficiencies.

(iii) the need of the United States to conserve all forms of energy and the relative scarcity and value to the United States of all fuel used to generate electricity.

(iv) the specific patterns of use of electric vehicles compared to petroleum-fueled vehicles.

* * *

49 U.S.C. § 32905

§ 32905. Manufacturing incentives for alternative fuel automobiles

(a) Dedicated automobiles.--Except as provided in subsection (c) of this section or section 32904(a)(2) of this title, for any model of dedicated automobile manufactured by a manufacturer after model year 1992, the fuel economy measured for that model shall be based on the fuel content of the alternative fuel used to operate the automobile. A gallon of a liquid alternative fuel used to operate a dedicated automobile is deemed to contain .15 gallon of fuel.

(b) Dual fueled automobiles.--Except as provided in subsection (d) of this section or section 32904(a)(2) of this title, for any model of dual fueled automobile manufactured by a manufacturer in model years 1993 through 2019, the Administrator of the Environmental Protection Agency shall measure the fuel economy for that model by dividing 1.0 by the sum of--

(1) .5 divided by the fuel economy measured under section 32904(c) of this title when operating the model on gasoline or diesel fuel; and

(2) .5 divided by the fuel economy--

(A) measured under subsection (a) when operating the model on alternative fuel; or

(B) measured based on the fuel content of B20 when operating the model on B20, which is deemed to contain 0.15 gallon of fuel.

* * *

(e) Electric dual fueled automobiles.--

(1) In general.--At the request of the manufacturer, the Administrator may measure the fuel economy for any model of dual fueled automobile manufactured after model year 2015 that is capable of operating on electricity in addition to gasoline or diesel fuel, obtains its electricity from a source external to the vehicle, and meets the minimum driving range requirements established by the Secretary for dual fueled electric automobiles, by dividing 1.0 by the sum of--

(A) the percentage utilization of the model on gasoline or diesel fuel, as determined by a formula based on the model's alternative fuel range, divided by the fuel economy measured under section 32904(c); and

(B) the percentage utilization of the model on electricity, as determined by a formula based on the model's alternative fuel range, divided by the fuel economy measured under section 32904(a)(2).

(2) Alternative calculation.--If the manufacturer does not request that the Administrator calculate the manufacturing incentive for its electric dual fueled automobiles in accordance with paragraph (1), the Administrator shall calculate such incentive for such automobiles manufactured by such manufacturer after model year 2015 in accordance with subsection (b).

* * *